Science WONDER Stories

January

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HUGO GERNSBACK Editor

Science Stories by
ED. EARL REPP
DR. MILES J. BREUER
DR. DAVID H. KELLER

The Man with the "Grasshopper Mind"

YOU know this man as well as you know **YOURSELF**. His mind nibbles at **EVERYTHING** and masters **NOTHING**.

At home in the evening he tunes in the radio—gets tired of it—then glances through a **MAGAZINE**—can't get interested. Finally, unable to **CONCENTRATE** on anything, he either goes to the **MOVIES** or **FALLS ASLEEP** in his chair.

At the **OFFICE** he always takes up the **EASIEST** thing first, puts it down when it gets **HARD**, and starts something else. **JUMPS** from **ONE THING TO ANOTHER** all the time!

There are thousands of these **PEOPLE WITH GRASSHOPPER MINDS** in the world. In fact they are the very people who do the world's **MOST TIRESOME TASKS**—and get but a **PITTANCE** for their work.

They do the world's **CLERICAL WORK**, and routine drudgery. Day after day, week after week, month after month, year after year—**ENDLESSLY**—they **HANG ON** to the jobs that are smallest-salaried, longest-houred, least interesting, and poorest-futured!

If **YOU** have a "grasshopper mind" you know that this is **TRUE**. And you know **WHY** it is true. Even the **BLAZING SUN** can't burn a hole in a little piece of **TISSUE PAPER** unless its rays are focussed and concentrated **ON ONE SPOT**!

A BRAIN THAT BALKS at sticking to **ONE THING FOR MORE THAN A FEW MINUTES** surely cannot be depended upon to get you anywhere in your **YEARS** of life!

The **TRAGEDY** of it all is this: you know that **RIGHT NOW** you are merely jumping **HERE AND THERE**. Yet you also know that you have **WITHIN YOU** the intelligence, the earnestness, and the ability that can take you right to the high place you want to reach in life!

What is **WRONG**? **WHAT'S** holding you back?

Just one fact—one **SCIENTIFIC** fact. That is all. And when you know what it **IS**, then you can easily learn how to apply it; make it carry you **STEADILY, POSITIVELY, AND DIRECTLY** to prosperity and independence.

That fact is one which has been **PROVEN** and stated by the world's foremost scientists and psychologists. You are only **ONE-TENTH** as successful as you **COULD** be! Why? **BECAUSE**, as Science says, you are using only **ONE-TENTH** of your real **BRAIN POWER**

TEN per cent of his brain is all the **AVERAGE** person uses. He is paid for **ONE-TENTH** of what he really possesses because that is all he actually **USES**. The remainder lies dormant. The longer it is unused, the harder it becomes to use it. For the mind is like a muscle. It grows in power through exercise and use. It weakens and deteriorates with idleness.

What can you **DO** about it? That is the question you are asking yourself. Here is a suggestion.

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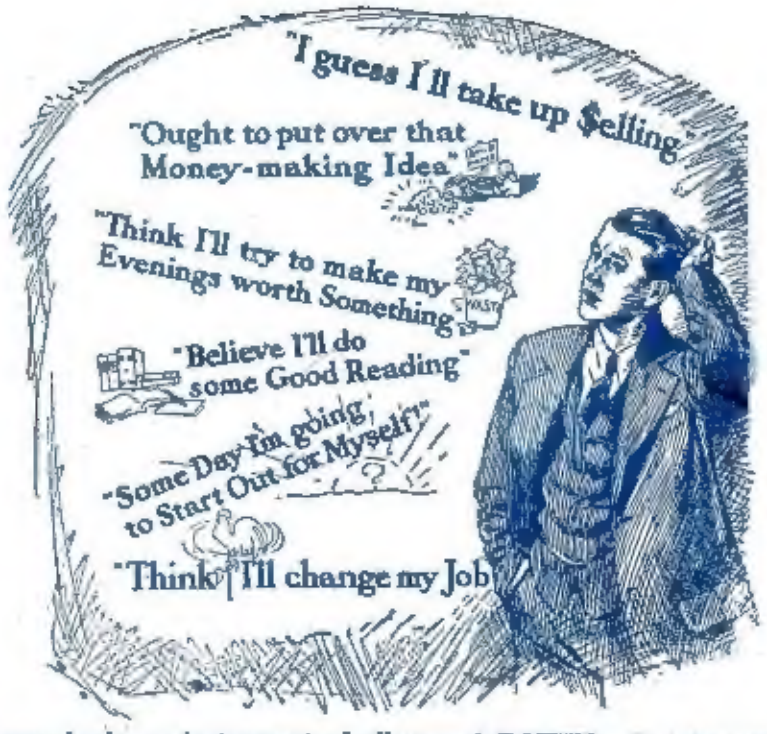
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If You Were DYING TO-NIGHT

and I offered something that would give you ten years more to live, would you take it? You'd grab it. Well, fellows, I've got it, but don't wait till you're dying or it won't do you a bit of good. It will then be too late. Right now is the time. Tomorrow or any day, some disease will get you and if you have not equipped yourself to fight it off, you're gone. I don't claim to cure disease. I am not a medical doctor, but I'll put you in such condition that the doctor will starve to death waiting for you to take sick. Can you imagine a mosquito trying to bite a brick wall? A fine chance.

A RE-BUILT MAN

I like to get the weak ones. I delight in getting hold of a man who has been turned down as hopeless by others. It's easy enough to finish a task that's more than half done. But give me the weak, sickly chap and watch him grow stronger. That's what I like. It's fun to me because I know I can do it and I like to give the other fellow the laugh. I don't just give you a veneer of muscle that looks good to others. I work on you both inside and out. I not only put big, massive arms and legs on you, but I build up those inner muscles that surround your vital organs. The kind that give you real pep and energy, the kind that fire you with ambition and the courage to tackle anything set before you.

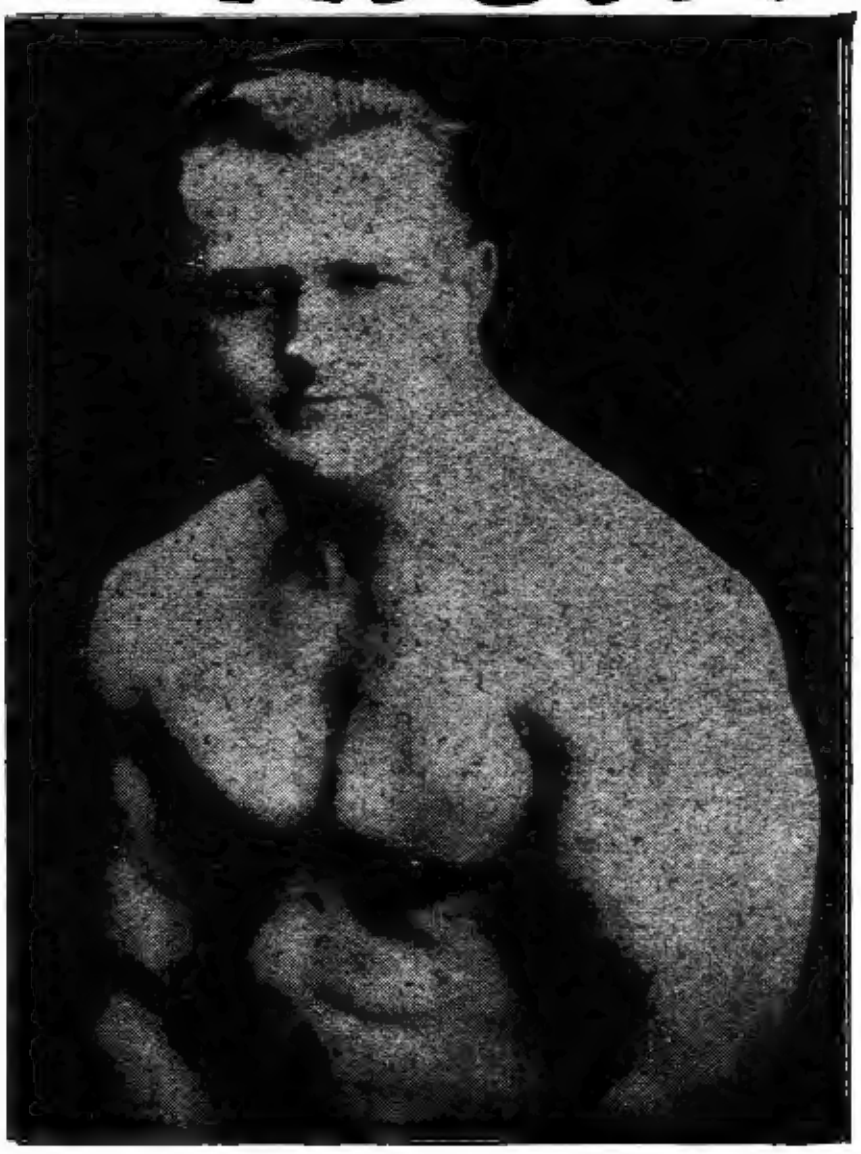
ALL I ASK IS NINETY DAYS

Who says it takes years to get in shape? Show me the man who makes any such claims and I'll make him eat his words. I'll put one full inch on your arm in just 30 days. Yes, and two full inches on your chest in the same length of time. Meanwhile, I'm putting life and pep into your old back-bone. And from then on, just watch 'em grow. At the end of thirty days you won't know yourself. Your whole body will take on an entirely different appearance. But you've only started. Now comes the real works. I've only built my foundation. I want just 60 days more (90 in all) and you'll make those friends of yours who think they're strong look like something the cat dragged in.

A REAL MAN

When I'm through with you you're a real man. The kind that can prove it. You will be able to do things you had thought impossible. And the beauty of it is you keep on going. Your deep, full chest breathes in rich, pure air, stimulating your blood and making you just bubble over with vim and vitality. Your huge square shoulders and your massive muscular arms have that craving for the exercise of a regular he-man. You have the flash to your eye and the pep to your step that will make you admired and sought after in both the business and social world.

This is no idle prattle, fellows. If you doubt me make me prove it. Go ahead, I like it. I have already done this for thousands of others and my records are unchallenged. What I have done for them, I will do for you. Come then, for time flies and every day counts. Let this very day be the beginning of new life to you.



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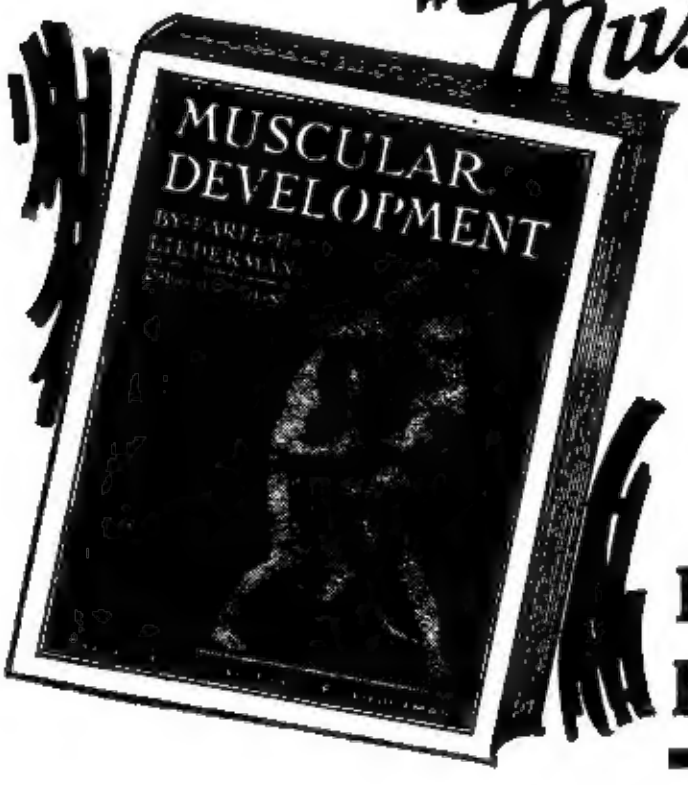

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It contains over four dozen full-page photographs of myself and some of the many prize-winning pupils I have trained. Some of these came to me as pitiful weaklings, imploring me to help them. Look them over now and you will marvel at their present physiques. This book will prove to be an impetus and a real inspiration to you. It will thrill you through and through. And it's all yours, I don't ask a cent. This will not obligate you at all, but for the sake of your future health and happiness do not put it off. Send today—right now before you turn this page.

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Vol. 1, No. 8

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ON THE COVER

this month is shown the strange sentient visitor from outer space, dominating the precincts of Loon Marsh. His feelers, ending in purple disks, are ready to extend over the marsh. On the edge of the marsh are shown the brave men, armed with rifles, who are attempting to shoot down the invader.

NEXT MONTH

IN THE LAND OF THE BIPOS, by Francis Flagg. We earthlings are too often apt to assume that our dominance over other forms of life on this planet is a natural and inevitable thing. We believe it is our right to have domestic animals at our service, and to have animals supply us with a great deal of our food. That there no inevitability about this state of affairs, Mr. Flagg brings out very convincingly in his thrilling story. It is possible, as he indicates, that the natural conditions of a land may be such that some other form of life will be in the ascendency and man relegated to an inferior, or even degrading position. Mr. Flagg has worked out this theme in a most wonderful manner and, we are sure, you will be as thrilled with his story as we were.

STREAMERS OF DEATH, by Henrik Dahl Juve. This author, so well known to readers of "Air Wonder Stories," now turns his versatile talents to an unusual story of the control of natural forces. It is well known that we are very much affected, both physically and mentally, by the world about us. The Aurora Borealis is more than a striking display of color; it is, in fact, an electro-magnetic phenomenon which exercises a great effect on the lives, particularly of those living in the northern part of the northern hemisphere. It is possible to produce such phenomena artificially and, if one did so, he would exercise a great power over the lives of all of us. How this is done is told by Mr. Juve in a very dramatic and a very convincing story.

A RESCUE FROM JUPITER, by Gawain Edwards. Many scientists believe that, due to its great distance from the sun, it is impossible for the planet Jupiter to support life. It is true that the planet would receive only one twenty-seventh of the light and heat from the sun that the earth does, but we know so little about that giant planet of the solar system that it is impossible, as Mr. Edwards points out, to be sure that there are not some internal conditions of the planet which would render it habitable. Mr. Edwards has written a marvelous interplanetarian story, and, as one of our newest and most promising science fiction authors, we believe that he will be welcomed heartily by our readers after they have read his first story.

AND OTHERS.

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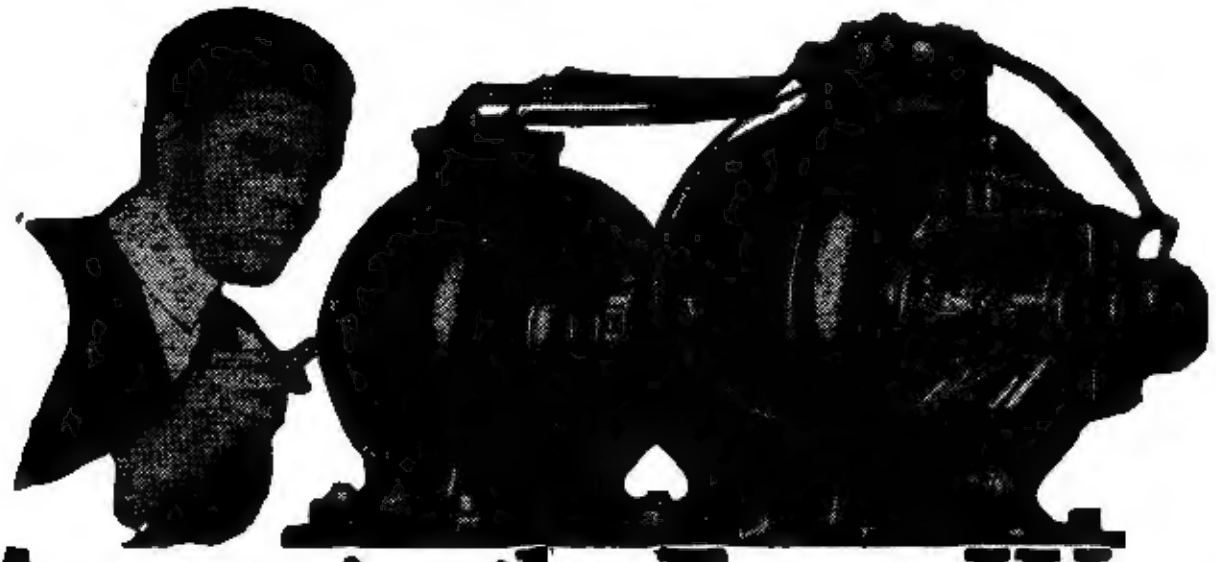

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VOLUME 1
No. 8

Science WONDER Stories

JANUARY
1930

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These nationally-known educators pass upon the scientific principles of all stories.

WONDERS OF OTHER WORLDS

By HUGO GERNSBACK

THE subject which is undoubtedly uppermost in the mind of every lover of astronomy today is the possibility of the existence of other worlds similar to the earth.

The astronomer will tell us—and this is the view generally held today—that the conditions which produced our planet and its life are quite exceptional. The theory held by most astrophysicists today is that another sun passed near our own, some billions of years ago, and created a tremendous tidal pull on our sun; the latter then threw off vast masses of matter, which solidified into our planets. There are many proofs of the correctness of this theory. But, admitting that this phenomenon is rather rare, it should always be borne in mind that the number of years, which may pass before the same condition is reproduced elsewhere, is of no importance; and that even a billion years is but a fleeting moment, if compared to the life of the universe itself.

Nature, however, never works in small units. There are billions of suns, millions of nebulae, scattered thrugh space; it is almost certain that, in not a few instances, a planetary system like our own has been repeated somewhere else. Whether these are in our own "island universe" or in some other universe, matters not. The important point is, that there are probably many planets rotating about other suns and receiving the same degree of heat and light as our earth; and, if that is the case, we may be quite certain that life has a favorable chance to exist on such a planet.

It is true that the *exact* conditions of our own earth are, in all probability, not duplicated once in a million solar systems. But there are billions of such systems; and therefore the mathematical probabilities favor the existence of life in other universes.

Of course, the nature of the life on other planets is anybody's guess. Life often takes the most improbable shapes; and we know from our own earth that, no matter how fantastic our imagination, nature usually goes us one better and produces things even more fantastic.

But the chances are that the exact counterpart of a human being is not found anywhere else; even though it seems certain that high intelligence, as we know it, exists elsewhere.

Most of the life on our earth cannot exist for any length of time at a temperature twenty or thirty degrees (centigrade) below freezing or at the boiling point of water. In other words, life as we know it exists over only an exceedingly narrow temperature range. There is, however, no good reason for believing that other forms of life may not exist, even near the absolute zero. The famous Swedish savant, Arrhenius, many years ago proposed the theory that life-bearing spores could easily be driven by the force of light-radiation through interstellar space, where the temperature is not far from the absolute zero. If such spores should finally land on some favorable spot, a more complex life might no doubt develop.

Naturally, the conditions on other worlds would be vastly different in many other respects from what we have on earth.

For instance, the blanket of atmosphere that surrounds our earth is probably vastly different in extent and quality from those of other worlds. We can conceive of a planet whose atmosphere lets through ultra-violet and other rays in a different degree than does our own atmosphere. This alone would certainly change life to a marked degree. Then, a goodly proportion of our stars are so-called "binaries," that is, double stars; and, when we imagine a planet rotating around one of these double suns, we again find conditions totally different from those on earth. A planet with its face turned constantly towards either of the two suns would have daylight over a goodly portion of the globe at all times; in other words, the planet would be lighted from all sides. Even though the planet were rotating like our earth, so far as its heat and light are concerned there would be peculiar phenomena. It is also quite possible that each sun might supply different amounts of light or different rays—all depending upon the age of the stars. A hot mature star emits light whose spectrum tends towards the violet, while the cooler stars, both younger and older, emit redder light. All of this would cause profound differences in the living conditions of the planets revolving about a double star. The tides would, of course, be twofold, similar to the double pull on the earth from the moon and from the sun.

All of this, however, is pure speculation; because nothing of other worlds is known, and the chances are that, because of the terrific distances that separate us, even from our nearest stars, very little will ever be known.

The FITZGERALD CONTRACTION

By Miles J. Breuer M.D.

Illustration By Paul

The silk-clad people from the machine remained with the same expression of intense perplexity on their faces. The old man, however, was leading the weeping girl back up the gangplank.

By the Author of "The Girl From Mars"

I REMEMBER Wendelin's words vividly to this day. I had been lecturing him for being a moody recluse, and had been trying my best to get him to come out to spend an evening in the society of young people. He sat with his back turned toward me, his head bent over a blue-covered book, and paid no attention to me. Suddenly he slammed the book face down on the table and wheeled ponderously around at me.

"You mean a man is in love, not with a particular girl but with a type," he demanded in his slow, deliberate way: "Is that it?"

I nodded.

"All these fellows who would die for the only girl in the world," I replied, "could die quite as devotedly and enthusiastically for any other girl of her particular physical and dispositional type. And yet here a fine, well-situated young fellow like you goes moping because three years ago your fiancée was suddenly killed in an unfortunate accident. Any competent artist or novelist—one who knows his business—or movie producer, could pick out dozens or hundreds of her type who could make you just as happy and cause you to act just as foolish, as she did. But, since you won't hire a qualified expert to select your type for you, you've got to get out and mix with people. You can't find her by grinding around here."

Wendelin stared for some minutes in silence.

"You mean well, Bill," he said in a low voice. "I'm grateful to you. You may possibly even be correct about your types. But not for me. Listen, Bill." He stopped a moment and looked at me gravely: *"There isn't a girl in this world that I could love!"*

I didn't pay any exceptional attention to that at the time. It sounded like the same thing that any man would say under the circumstances; and Wendelin, being dogged and ponderous, was taking three years to get over his sorrow, where another would have forgotten it in as many months. I kept on trying to persuade him to go out for the evening with me. It was only later that memory brought back to me the deep reverberation of his solemn words. He placed a slight accent on the "this":

"There isn't a girl in this *world that I could love!"*

Fate has a curious way of astonishing us with things which she has plainly prophesied to us long before. When the time came and Wendelin married a girl who was not of this world, nor even of this *time*, his slow, tolling words came vividly back to me. Just now, I was intent on getting him to sally out with me.

Wendelin looked stolid, but he was clever. With his fair hair rumpled and his blue eyes absorbed in the book, the huge mountain of him slouched in his chair, he may have looked formidable physically, but certainly not intellectually. And yet here is what happened to me.

DR. MILES J. BREUER

Seeing me determined to get him out into feminine society, he quit arguing. He gave me a generous slap on the shoulder.

"You're a good pal, Bill. You would like to see me as happy as you are, spending an evening with your sweetheart. I understand you. But I can't be happy that way. Just now, this stuff is fascinating me more than the company of girls possibly could. I almost hesitate to show it to you for fear it will make you forget your own sweetheart."

The Lost Continent

HIS words made me look in dubious surprise at the blue-covered book, as though it held some powerful mystery.

"What do you make of this?" he asked.

"Hindoo hieroglyphics, or Arabic hen-tracks, or something. And some ugly stone gods." I seized the book and looked at its title.

"The Lost Continent of Mu! What's that?"

"Something that mathematical physicists ought to know more about," he said, slyly. "This is an account by a Colonel James Churchward* of some remarkable evidence which he discovered in an ancient and hidden Hindoo temple. On the basis of this evidence he spent several years investigating among the islands of the Pacific, and has accumulated a mass of data indicating that a continent once existed in the Pacific Ocean. The Continent of Mu—so long ago that it makes Egypt, Babylon, and Assyria, and even India and China with their ancient civilizations seem like little sprouts of yesterday—had a population as great as ours today, and a civilization that was probably more advanced than ours. This continent with its civilization has completely disappeared. Only a few traces are left——

"Now recollect what geologists say about that part of the Pacific. This is not part of Churchward's book, but is nothing new. The tremendous depth of the ocean, the vast stretches of deep water without an

HERE is, truly, a most remarkable science-fiction story. We could easily wax enthusiastic over it, but would rather have you do so; and, if the editor is not mistaken, this story will cause no end of comment. One thing, the story is based upon pure science; and, in this case, the science comes pretty close to assuming the impossible, as it very often does. It is usually that which is unknown to us that we identify with the "impossible." But, very often, the impossible becomes the commonplace.

The Fitzgerald contraction theory is today accepted by all scientists; but, like many other branches of pure science, the contraction theory has never been translated into practice. Dr. Breuer has taken a difficult subject and made a wonderful story from it.

*Author's Footnote: Published in New York in 1926 by William Edwin Rudge, and obtainable through any bookseller.

island, the resemblance of the island volcanoes in the surrounding islands to similar structures on the Moon —what became of *Mu* and its civilization? Was it the fragment of the Earth that broke off to form the Moon?"

He gazed at me enthusiastically for a while.

"Interesting," I admitted, "but not enough to keep me from going to the Trianon with Wilma."

"The continent of *Mu*," he continued, "was evidently the real birthplace of the human race. Our present culture started in Himalayan India, and has descended to us from some fragment or colony of this civilization that somehow got across to Eur-Asia. This colony or fragment perpetuated, through many vicissitudes, the culture of the parent civilization after the cataclysm which destroyed the latter."

"But how do you reconcile dates?" I asked. "The Moon got loose somewhere between a quarter and a half million years ago. The human race has not existed that long."

"Only some people say that," he replied. "On the contrary, there are many indications that the human race *has* existed that long. There is evidence in Churchward's book, and among the findings of other Pacific explorers that at a time when we commonly think that man was an ape-like brute, he was at least as highly civilized as we are now. Look! Some of the ancient philosophy handed down in India (no doubt considerably disfigured during the handing-down process) looks very similar to the Einstein stuff that you are so much concerned in teaching your students. It is expressed in different words; two ways of telling the same Truth."

I stared at him incredulously—a challenge in my attitude.

"For instance: In the Theory of Relativity you have some trouble about *identity*. Is a definite particle really the same thing all the time, or does it just maintain position and attributes, like a wave in the water?* Now tell me how that differs essentially from the Buddhist conception of all individuality being submerged in *Nirvana*? Or, take the cycle within cycle of electrons, atoms, molecules, solar systems, universes —aren't those the various 'planes' of the Theosophical system?"

For a moment I stood in thought, somewhat puzzled to catch his idea. These fanciful discussions had not been uncommon between us during the two years that we had shared an apartment; and were doubly interesting because I was a theoretical scientist while his contact with science was practical and applied. Probably for that reason his discussions were always wild fancy, while I usually strove to keep my feet on solid ground. It usually works out that way.

I stood there puzzling to catch his idea. Then I suddenly caught it. I looked hurriedly at my watch.

"You big crook!" I exclaimed. "I'll be late for my date with Wilma!"

He stood there in his dressing-gown and grinned. He had deliberately held me, killing time with his wild ideas, until it was too late for me to expect him to get ready to go out for the evening, and until I just barely had time to dash out and keep my own appointment. Which was a much more enjoyable way for him, of winning his point, than by arguing about a subject which was to him painful and uncongenial. And then people thought he was dull.

I plunged out into the night, shouting back at him through the slamming door:

"I'll get you tomorrow for this!"

But I didn't. For, "tomorrow" the bright body appeared, and the next day Wendelin found the photon-ship. For Wendelin (as you will now guess, that is not his real name) is the late Superintendent of the Cicero Airport in Chicago, the man who found the photon-ship and who was so sensationally involved with some of the strange people who came out of it.

CHAPTER II

The Bright Body

"THE LOST CONTINENT OF MU" lay tossed aside in neglect on a corner of the table. As I opened my eyes and yawned and stretched in bed, I saw it through the bedroom door and Wendelin up and dressed. This was natural, for he had been sound asleep the night before when I had come in. Anyway, I had had a good time.

Then, when I awoke more fully and noticed Wendelin more clearly, I sat bolt upright in bed. His tense, eager attitude as he bent over the morning paper meant something. What was up? He seldom took more than a casual and contemptuous interest in the daily newspapers.

"What's happened?" I inquired, jumping up.

I might have known that a couple of grunts would be all that I got. But he motioned for me to come and look for myself. Over his shoulder I saw the headlines; they held the right-hand column of the front page:

"STRANGE MASS DISCOVERED NEAR MOON, ASTRONOMERS PUZZLED

Bright, Swift Body Discovered Yesterday Afternoon."

Of course that was what had captured his attention. The new British cabinet, or the railway merger lawsuit were hardly capable of getting a second glance out of him. He grunted again as I put a hand on his shoulder.

"Occasionally the newspapers print something that redeems the crime of their existence," he offered.

"Let's have it," I suggested, as I picked up my shaving-brush. He read aloud:

"Professor MacQuern of Yerkes Observatory was the first to report yesterday at 7:10 P. M., the appearance of a bright body at one side of the moon. It was distant from the limb about half the moon's diameter and showed in the telescopes as a small disc. Its brilliance was remarkable. The astronomers made no at-

* Author's footnote: "Permanent identity of particles is a property of matter which Lord Kelvin sought to explain in his vortex-ring hypothesis. This abandoned hypothesis at least teaches us that permanence should not be regarded as axiomatic, but may be the result of elaborate constitution. There need not be anything corresponding to permanent identity in the constituent portions of the aether; we cannot lay our finger at one spot and say: 'This piece of æther was a few seconds ago over there.'" A. S. Eddington, in *Space, Time, and Gravitation*," Cambridge University Press, 1921.

tempt to explain its nature; obviously they haven't the least inkling of what it might be. In reply to inquiries they state that it corresponds to no object known to science.

"Could it have arrived from interstellar space? Perhaps; but if so, it must have come at an unimaginable speed, a speed exceeding enormously that of any known celestial body. For, the night before, it was nowhere visible; plates made the previous night had been promptly and carefully studied and did not contain it. Yet, tonight it is here, brighter than the moon itself; so bright, that, traveling at ordinary astronomical speeds, it must have appeared as a faint star at least several days ago. If it has arrived from interstellar space in twenty-four hours, from invisibility to a brightness considerably greater than what is known as 'the tenth magnitude' it must have come with a speed greater than any other body in the heavens."

Wendelin looked at me with a wide grin as he folded the newspaper to get at the inside sheets. For, the last two sentences had caused me to put down my razor and stand there with face lathered trying to understand the thing. Every year I devoted half an hour in lecturing on the subject of the maximum velocities, theoretically attainable by matter.

"Impossible!" I exclaimed. "Matter cannot travel that fast."

"It must be true! The newspaper says so!" he said ironically and continued reading:

"By 8:30 P. M. the wandering spot had entered the moon's disc, against which it shone clearly as a much brighter area. By this time several of the larger observatories had calculated its diameter as something around two hundred feet, all agreeing to within a few yards. Every fifteen minutes the Associated Press dispatched bulletins reporting the progress of the spot across the face of the moon. By 8:45 P. M. it had traveled across the entire diameter of the moon's disc, and was reappearing against the sky beyond the further rim. Then it disappeared behind the rim. It was revolving around the moon, and was now on the dark side!

"A sub-satellite! A moon of the moon! Whatever the mystery of whence it came or how, one thing is plain: it is going to be a tiny satellite to our moon. Its speed of revolution is unusually high, but not impossible. Though it had arrived from space at a speed too high for astronomers to understand, the velocity of its progress about the moon is at least a perfectly admissible astronomical quantity.

"Perhaps then it has not arrived from space. Perhaps it is a mass ejected from the moon itself. Perhaps some dying spasm of our decrepit satellite has shot it out volcanically into space where we now saw it. That would explain its extraordinary brightness: it is incandescent, just as a volcanic mass would be expected to be.

"At 12:30 this morning reports came in of its reappearance at the edge of the moon where it had originally appeared, and later of its second entrance into the visible disc of the moon. Then reports stopped. Therein comes the mystery, for travelling as a free satellite it should have reappeared much sooner.

"The Associated Press has continually sought to obtain a statement from all known observatories by telephone. Astronomers, however, decline to give out any more information. One and all, as though they had mutually agreed on it, they refused to say anything. Why? Is the strange object so bizarre, that astronomers are so uncertain as to their interpretation and significance, that they are unwilling to make any statement?

"From 12:30 until four o'clock this morning the body has been seen only once. It described a circle on the disc of the moon with a radius about half that of the moon's disc, and concentrically with it. Then it traveled to the center and remained there."

A Lecture on Probability

"ALL right," I said, when he stopped reading: "Now what is the thing? It's up to us to decide, isn't it?" I had recovered my equanimity and gone on with my shaving.

"I know you'd love an argument," Wendelin said: "But I've got to get started toward work, and so do you. But, it might be an incandescent fragment blown off the moon, and fallen back again."

I nodded assent, tugging at my collar.

"Or," he continued, "it might be a space vehicle from a distant planet."

I turned and fixed him with a reproving stare.

"What!" I shouted: "Dreaming again? Wake up! It's morning."

"Don't get funny," he replied soberly: "Why isn't it possible?"

"You're a darned good atmospheric aviator; and I take pleasure in paying you the compliment," I answered: "But flying through interstellar space is something different."

"Why isn't it possible?" he repeated.

"Possible, perhaps," I admitted. "But probable? The chances against its probability are the square of a million to one. There's only one chance in a million that there is another inhabited planet in the universe; and given that probability, only one chance in a million that its inhabitants could make a space vehicle and get over here in it."

"But——"

"Oh, I know. You have read lots of stories in the science fiction magazines. But we're talking about the *real* probability in the *real* universe."

"Where do you get that million to one?" he demanded.

"I'll tell you, but I'll have to make it brief, for we've got to get to work. You realize, do you not, that this is a subject that comes into the domain of my everyday teaching?

"Scientific thought* is fairly well agreed at the present time that the possibilities of intelligent beings anywhere else in the universe, are mighty rare, if any; the accent being on the *if any*. Why?

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*Author's footnote: This argument is taken from the following: Maunder: *Are the Planets Inhabited*, Chapter XI; Harpers, 1913; A. S. Eddington: *The Nature of the Physical World*, beginning page 169; Macmillan, 1929; James Harvey Robinson: *The Mind in the Making*, Harpers, 1921. These books are all of a popular-scientific nature, and can be understood and appreciated by the non-technical reader.

"The basis of life is protoplasm. To exist, protoplasm needs definite conditions within extremely narrow limits as compared with the wide range of conditions as they exist in general in the universe: heat, light, moisture, oxygen, and gravitation. These factors must *all* be exactly right. If only one of them is a little off, life cannot exist. 'One black ball rejects.' Three different experiments were made on this planet before intelligent being evolved: reptiles, birds, and mammals. The mammalian, and still more, the human form must be associated with life, before a high type of intelligence can be produced.

"Conditions sufficiently like those on earth, which are necessary to support mammalian life, do not prevail on any other planet in the solar system. Mercury is too hot. Venus has one face to the sun, too hot and steamy; the other eternally cold and dark. Mars, the only planet on which we can discern a solid surface, is cold and dead; there is neither enough air nor water nor light enough to support a civilization. The rest of the planets are too dark and far away, and probably not yet solid.

"The Earth is unique in the solar system. For instance, our moon is 1/80 of the mass of the Earth; the next largest moon in the solar system, Saturn's moon Titan, is 1-4000th of the mass of its planet. It must have been a rare and unusual combination of circumstances that produced our moon. And, if it had not been broken off from the Earth, forming the great cavity filled by the Pacific Ocean, the whole surface of the Earth might be covered with water. Then where would man be?

"Now, of the hundreds of millions of stars outside our solar system, is it rash to say that somewhere the same conditions exist as on Earth, favorable to life and intelligence? We cannot say that they do not exist; but we can say that they are extremely rare, if they do exist; that our Earth is the exception in the universe, not the rule.

"One star out of three is a double or binary; and, to the best of our knowledge, it is not possible for double stars to have a planetary system. In fact a solar system like ours is not a typical product of the development of a star, nor even a common variety of development. It is a rare freak. It could be formed if only at a certain stage of condensation an unusual accident had occurred; say the approach of another star within a distance not far outside the orbit of Neptune, and at just the right velocity. Such encounters must be rare. The density of stars in space is comparable to that of twenty billiard balls roaming the whole interior of the Earth. The accident that produced the solar system would occur with about the same probable frequency as would the approach of two of these balls within a few feet of each other.

"Man, therefore, is a rare accident in the universe. His existence depends on a series of rare accidents, so that the chances against the repetition of the evolution of Man are expressed by the product of the chances against all the individual accidents. Is it anything different for Nature to waste a million pollen grains for each one that finds its way to fertilize a pistil, than for her to expend a hundred million stars so that she may make a planet for man to live on?

"Therefore, the chances against last night's bright spot being a space vehicle from another planet are about one to 10".*"

Wendelin shrugged his shoulders.

"Looks to me like a space ship," he said blandly: "Acts that way."

CHAPTER III

An Arrival from Space

AT 8 o'clock in the morning I plunged into my work at the University and did not come up for air until eleven. Classes, interviews with students, reports and lectures, kept me submerged. At eleven I recovered consciousness, so to speak; and dashed across the street for a newspaper. I selected a *Post* as being the most conservative and accurate. The story now covered two columns of the front page:

STRANGE BODY'S SIZE INCREASES
OBVIOUSLY COMING NEARER

Astronomers Unable to Explain Its Movements.

"Late dispatches from nine observatories, as daylight put an end to observation, report the strange celestial wanderer discovered last night, as having increased about twenty per cent. in apparent size. That would indicate that ti is approaching the earth at a tremendous velocity. Astronomers are unwilling to accept the alternative hypothesis, that an actual increase in the size of the body has taken place. The idea of an approach toward the earth is supported by the change in color that occurred in the bright body as soon as it stopped moving across the telescopic field and began to increase in size. From a yellowish-white, exactly like that of the moon, it took on a faint but definite blue-violet tinge. This is just what would occur in a luminous body approaching the observer at a high velocity, because of the apparent decrease in wave-length of the emitted light. In spectroscopic work it is termed the Doppler effect.

"Just as we go to press, photometric observation confirms the idea of an approach toward the earth by the bright body. It has almost doubled in brilliance, which would approximately correspond to a thirty per cent. nearer approach, if we remember that the brightness would increase with the square of the distance approached. At its present rate of progress, the bright body will reach the earth just before dawn tomorrow."

The rest of the article I shall not quote. Its writer did not neglect to make the most of his sensational opportunity. Where would it strike? What was it composed of? If it were an incandescent mass of mineral, suppose it struck a city? Would Omaha or Kansas City be the target? With fiendish realism the writer painted the havoc it could wreak on impact, and described in gloating detail the appearance of the place after a huge meteor struck Siberia in 1914. The correspondent did suggest that it might be a space vehicle from a distant planet, and presented arguments on both sides of that question.

For some reason, the reports of that tiny bright

* 1 to 1,000,000,000,000.

speck, too small to be seen except in the big telescopes, gave me a strange thrill. I would have liked to keep my mind on it and speculate as to its nature and its strange journey. It seemed unfair that for four hours of the afternoon I should have to submerge the increasing flow of intriguing thoughts in a sodden flood of routine work. The pressure upon me was so intense that from one to five in the afternoon I hardly knew where I was or who I was. Then at five, like a diver emerging from a long underwater swim, I dashed eagerly out of the oppressive rooms, away from the oppressive routine into the open air and freedom for thought.

The evening edition of the *Post* held a long list of dispatches from European observatories, which had picked up the body just as it had ceased its erratic performances and struck out for the Earth; but these really told me nothing new. Then suddenly a boy came tearing down the street with a huge bunch of newspapers that seemed big enough to crush him flat to the sidewalk. He was yelling and stirring up a commotion as though he had been beset by assailants and was being beaten.

"*Daily News* Extry!" he blared, and went off into Siamese or Hottentot.

I seized a paper and yanked it open, while the boy plunged on into the quadrangle to meet the press of emerging students and faculty members. The headlines screamed:

MOLTEN MASS HURTLING EARTHWARD;
BODY FOUND TO BE SOLID MASS.
Professor MacQuern Gives Out Information

"The *Daily News* reporter at Boston succeeded in getting a few words with Professor MacQuern at eleven this forenoon, and was told that the spectrum of the bright body contained no Fraunhofer lines! This may not mean much to the average citizen, but was a knockout for the astronomers.

"'It means light from undissociated matter,' Professor MacQuern said. 'Such a spectrum can come only from a solid, incandescent body.'

"That can mean only that the bright body is an incandescent mass of mineral. Star spectra as observed by astronomers contain numerous transverse colored lines, known as Fraunhofer lines, and are produced by matter in the gaseous state.

"The latest checks on the course of the bright body confirm previous statements. It is headed toward the central portion of the United States, and is due to arrive shortly before dawn tomorrow."

In all truth there should have been a panic throughout the Mississippi Valley. With the terrible body headed straight for that region, some vast catastrophe was destined to occur. And there was no way of preventing it. Human effort was absolutely powerless to do anything to protect the threatened area. This part of the country is so densely populated that destruction of property and loss of life were bound to occur; there would be the rarest of chances for it to fall somewhere where it would do no harm whatever. There was a very fair probability of its falling into some city, in which case the death and destruction would be appalling.

One would have expected people to rush pell-mell from the threatened area. But no one did. No one knew whence to rush or whither. Should one flee, the body might strike the place to which he fled, quite as readily as the one from which he fled. I did not feel much fear, and I doubt if anyone else did. The chances of its hitting me seemed small; I lived in a sort of faith and hope that it was bound to strike somewhere else.

But I was eager to get a glimpse of it. The newspaper reports and a bulletin from the Yerkes Observatory posted on the board in the Administration Building, stated that it would be visible to the naked eye about eleven P. M. But, great crowds of us stood and watched and searched the heavens, and saw nothing. At one-thirty in the morning a group of us decided to go downtown; the bulletin boards of the *Tribune* and *Examiner* told us that the bright body had not been seen in any telescope. Surging crowds packed Madison Street around the newspaper offices, as they do on election nights or football nights. There were dispatches galore, but they all said that the bright body had not been seen at all that night. It had vanished.

Bulletin-board dispatches are not voluble; but in my own mind I could picture the thing, hurtling straight toward the Earth, even though invisible. It might be invisible because in the terrific cold of space it had rapidly cooled. Being no longer incandescent it no longer gave off light. But it was still coming. I went home to bed and fell sound asleep from the strain and exertion of the day.

In our modern civilized life, we keep up with what is going on simultaneously over the entire world. Every morning we Chicago folks have to know what happened last night in New York or Denver, or Calcutta or Bloemfontein. We would be seriously distressed if we were deprived of this contact with the whole world at our breakfast table. Therefore, we are dependent on the newspapers. Were it not for their rustling, ink-fragrant pages, we would be as isolated as a villager of the Fourteenth Century.

So, in the morning, eager to know what had become of the bright body, I dashed out for my *Tribune*. But, with a gradually sinking sensation, I realized that there was no news. There was a protesting-against-Fate sort of an editorial, marveling at the sudden disappearance of the object that for twenty-four hours had set the world agog. All the information that reporters, importuning at the observatory doors, had gotten was that the bright body was nowhere to be found. All the searching with telescopes had revealed—nothing! There was nothing to do but wait till it crashed.

At noon I emerged from the oblivion of my classes, and as it was Saturday I was through for the day. I hurried to a newsstand, for by this time, somewhere, the huge meteor must have fallen, splashing up tons of dirt, and spreading destruction and havoc far and wide.

But as I turned the pages of the *Post*, scanning rapidly up and down column after column, I found no mention of it. I tried a *Daily News* and an *American* in the same way, and finding nothing, threw down the whole mass of papers in disgust. A disgraceful way

for a meteor to let down the suspense of an anxious reading-public!

I reasoned that if it were going to fall at all, it would have struck by this time. Therefore, the only explanation was that in its erratic way it had struck off from the Earth, and was going somewhere else, or had fallen into the ocean. Our little draught of excitement was quaffed and done with.

"Back to the old humdrum life, and to trying to get Wendelin interested in some girls," I thought, as I headed towards my room.

As I stepped into the corridor of the apartment house, the telephone operator stopped me on my way past her desk.

"Mr. Wendelin telephoned asking if you would come to the field as soon as you got here. Says he has something that will interest you. Seemed to be excited."

Snatching a hasty lunch, I was soon on the cars, bound for the Cicero airport. There, after some search, I found Wendelin near the center of the vast field, standing still and staring toward the west.

"The last mail-ship has just left and I'm free till 4:30," he said as I came up. He seemed immensely pleased at my arrival. "I've been pretty busy, but my curiosity has been run ragged as to what that thing is." He pointed to the southwest corner of the field.

I could see nothing worthy of note, and said so. He seized my arm and pointed.

"Look! Aren't the fence-posts brighter in that corner? As though a bright light shone on them?"

They were. Just as though a brilliant searchlight had been turned on them. In spite of the daylight, they glowed with illumination. I looked about for its source.

"I assure you there's no light around here that could do that," Wendelin said. "I can't tell you where it comes from. Now look again. Do you see any fence just to the north of the corner? Or just a hazy, distance-like effect?"

"There's a break in the fence," I hesitated, "but one wouldn't notice it without looking closely."

"That fence was intact at ten o'clock this morning, and I've been out in this field all the time since, and didn't see anything happen to it. Well, look some more. Just back of the break in the fence is the Ford Assembling Plant. It has always been there, and was there at ten this morning. Do you see it?"

"I do not!" I gasped, remembering that I had seen it there many times. "What in thunder——?"

"Finally, look at the ground just in front of the gap in the fence. That corner isn't used much. The water-grass and Russian thistle are as thick there as they are right here. Do you see them?"

"No!" I exclaimed: "It looks distant, vapory. Not like ground at all. Like the end of things. What has happened to that place?"

"That's what I've been studying since I noticed it a couple of hours ago; but I've been too busy to get to it. I have come to the conclusion that there is something there. Something as big as our apartment house, but camouflaged or invisible. You can't see it, but you can see it's there. Because you can't see through it, and it blocks off the things behind it."

I peered intently. He was right. A huge, vague chunk of the ground and background as blocked off, as though indeed something invisible stood in front of it.

"What in the world—— " I gasped. "How'd the thing get here?"

"What became of the bright body?" he asked in return.

Then I seized his arm.

"Come. Let's have a closer look at it!"

CHAPTER IV

An Obstruction

IN a moment both of us were striding toward the queer dimness in the southwest corner of the field. The nearer we got to it, the more convinced we were that there was something there; although we could see nothing. What the mystery of its invisibility was we could not conjecture even sufficiently to begin a conversation about it. We were both determined to walk right up to it and see if we could feel anything with our hands.

"After we know more about this," Wendelin panted, walking quickly, "we'll find out that it's got something to do with the bright thing against the moon."

"Now then," I said as I half ran, "suppose it turns out that you are right? Suppose the thing really is a space machine? Why is it that you know about it before the rest of the world? Is it because you are endowed with some sort of mysterious prophetic powers, or because you can subconsciously see hidden truth across space and time——?"

"Aw, cut the comedy, Bill. It's just because I've got some imagination, and have the nerve to conceive things that the rest of you are too hide-bound to admit. It's the explanation that fits the facts best, and I'm not afraid of it——"

His speech and our run were cut short by a terrific flash of light. Ahead of us there sprang into our vision a huge ball of yellowish-white blaze, so intense that we were instantly blinded. I stumbled to my knees and a great pain burned into my brain. I heard Wendelin give a hoarse shout beside me. It felt as though we had suddenly run up close to the glaring ball of the sun itself.

It was many minutes before I could force myself to open my burning eyes. I made the attempt with my back turned toward the direction from which the glare had come. All I could see were flashes and glows and dancing lights and glares. In a moment I realized that these were from my own paralyzed retina; and I settled down to a wait of several minutes to give my eyes time to recover from the shock. In about ten minutes I could look about and see things fairly well; though when I closed my eyes, I was still conscious of a glare. And when I could see, I felt a mild surprise to note (with my back still turned to the place of mystery) that the field, the hangars, and the buildings beyond the fence were all in order, just as they always had been.

Then it dawned on me that the blaze was gone. If it had still been there, there should have been a black shadow of me stretching out ahead, and a glare all around. There weren't any. At the same moment I perceived that Wendelin was also turning around warily. Cautiously I turned, first the corners of my eyes, and then my full vision, to that southwest corner.

The whole end of the field was filled by a huge, looming bulk. Now, it looked solid and heavy; a sort of dark, bluish gray. A good look at the gloomy thing showed it to be a huge polyhedron of metal, with octagonal faces as big as the size of a house. In diameter it was a city block, possibly just a little less. It towered hugely above us as we approached; but we kept on toward it.

The first glance at it disposed of any possible doubt as to its artificial origin. The straight, smooth edges of metal, the flat plates between them, the half-dozen glass windows, the huge bolt-studded door, all positively precluded the idea of its being an inorganic meteor. It was something that had been made by intelligent beings.

Shouts behind us caused me to turn around. There were people running toward us. I had thought that the field was deserted; but there is no such thing. In Chicago, no matter what happens, a crowd will collect in thirty seconds.

As I turned my eyes back to the huge polyhedral thing, I gasped. The big door in the octagon next to the ground was open a little. It continued to open further. We weren't over thirty yards away, with the dark bulk looming almost over our heads; and we could hear the grating of some sort of mechanism as the heavy door swung open. Out of the yellow-lighted circular opening slid a ramp or gangway, that touched the ground. With our eyes popping out of our heads in amazement we continued to walk mechanically ahead as a group of people walked out of the gloomy thing down the gangplank.

Wendelin and I plodded ahead, studying the people meanwhile. At first glance, we thought they were Chinamen. Three of them wore soft, silken, gorgeous blouses of green with red, brown, and black designs; and loose, pajama-like trousers. The other two had nothing in common with Chinamen. They looked like Grecian maidens, in beautiful silky tunics; one blue, one pink. Their legs were bare. All of them moved heavily, as though walking were a task.

Then we perceived their heads and faces. Their faces were certainly not Chinese. They were perfectly Caucasian in shape and color; and they were very noble-looking faces, more like those of the ancient Greeks than anything I can compare them with. Since then, I have been asked many questions about them, and the only way I can express it is, that they were more like us than we are ourselves. If there was any marked difference, it was that their skins looked very much tanned, as though they had been in the sun a great deal.

The Visitor From Space

WHEN we were a dozen feet away from them, they stopped and looked at us. We stopped also.

If human faces can register utter bewilderment, theirs certainly did. They looked at us; they looked at the people running behind us; they looked about the field, at the distant buildings, and up at the sky; and they looked at each other. They frowned and shook their heads slowly, and looked about again, for all the world as though they hadn't the least idea of what it was all about. They spoke a few short, breathless words to each other. One of them shook his head sidewise, another nodded up and down, and both seemed to be agreed in their perplexity.

Then suddenly a little shriek came from among them. It was a sudden, startled shriek; not a frightened one, but rather a happy, feminine gurgle. It came from the blue-tunicked young woman, who, with her companion, looked to me very comely. Following the shriek there was a streak of silky blue, a flash of bare legs, and the next thing I knew, she had her arms about Wendelin's neck. She clung to him with all her might, buried her face in his shoulder, and softly crooned to him, twice over, something that sounded like:

"Ahn-ee-yaht! Mia Ahn-ee-yaht!"

Poor Wendelin! I never saw anyone's eyes bulge out so far, nor anyone's face turn so many colors, as did his in the next few seconds. For a moment he stood as if paralyzed, his arms stuck stiffly out at his sides. In his baggy white "coveralls" he looked ineffably huge and clumsy as compared with the delicate pink-and-blue creature that clung to him.

Then the girl held him off at arm's length for a moment, as if to enjoy the sight of him. The look of joy in her face melted into a confused, inquiring expression. She studied him as he stood there dumb as a fire-plug, and her face changed from doubt to perplexity, and then suddenly to horror. She uttered another shriek, this time a piercing scream of fear, and whirled and ran swiftly back to her own people. There she wept on the shoulder of one of the green-pajamaed men, one with gray locks and wrinkled brow; and we could see her shoulders shaking with sobs.

"Mistook you for her friend," I ventured to Wendelin. But he stood as if in a daze, his eyes seeming as though they would start from their sockets and fly straight toward the sobbing girl.

By this time several of the approaching people had arrived and were standing there, panting and staring. Most of them had seen what had happened, and they gazed at Wendlelin with varying expressions. Some were rude and leering; others seemed sympathetic and genuinely sorry for the dazed man and the weeping girl. Others who had not seen what had happened came running up and stared at the whole tableau in amazement. There was a gabble of excited voices.

The silk-clad people from the machine huddled close together with the same expression of intense perplexity on their faces, except that the old man was leading the weeping girl back up the gangplank and through the door. As they disappeared within, I could see that he was patting her shoulder, and trying to comfort her.

Wendelin suddenly came to and barked sharply at one of the airport mechanics who had come running up.

"Telephone!" he ordered, "and make it snappy. First, the police station: two squads of guards out here,

pronto. Emergency. Second, the Chancellor's office at the University of Chicago. Have them locate Chancellor Burkett, give him my name, and ask him to get out here as quickly as possible!"

"Yes, sir!" the man said, and was on the run before Wendelin had finished talking.

The crowd gathered swiftly. The whole landing-field was sprinkled with people who had appeared out of nowhere, running toward us; and already the dense press behind us was gradually crowding us closer to the silk-clad group. To the sides of us, the crowd pushed forward and was surging against the huge machine, examining its walls, tapping and scratching them.

I was thoroughly disgusted with the behavior of the people. They abandoned themselves—taking the mob as a whole—purely to animal curiosity, with never a thought of consideration or courtesy. Here were guests from a distant, evidently highly-civilized planet, landed in what they supposed to be a civilized city of our Earth; and yet, instead of being courteously welcomed, they were about to be trampled by a herd of wild buffaloes.

The strangers consulted rapidly among themselves for a few minutes. They shook their heads and pondered, and seemed at a loss as to what to do. Then they slowly turned and walked up the gangplank, and disappeared within their vehicle. The gangplank slid inside and the door clamped shut.

Wendelin and I turned toward each other. I did not know what to say or do. He smiled, a transparent attempt at jocularity. Obviously the incident had sunk deeply.

"Wasn't bad while it lasted," he laughed; and the laugh sounded strained: "I wonder if we'll ever see them again?"

"You certainly showed presence of mind to send for the police," I said. "This mob will tear that thing up, purely from dumb curiosity, if they're not held back."

With a terrific commotion in the crowd, some thirty minutes later, a couple of dozen policemen pushed toward us. The retreat of the strangers into their machine had removed the crowd's last modicum of inhibition, and we were being squeezed against the walls of the huge vehicle. The substance of which the walls were composed was cool, and felt like lead. The policemen formed a circle around the huge object—I still hesitate for a name to give it—and by dint of much shouting, shoving, and threatening, they gradually cleared a space for a hundred yards around the machine.

Becoming Acquainted

"I'M afraid the harm's already done," Wendelin said. "Look's as though we've scared them in."

"I wouldn't blame them for picking up and leaving the solar system," I said: "In another ten minutes the crowd would have carried them away and their machine piecemeal for souvenirs."

We waited patiently for something to happen, but the machine remained huge, silent, inscrutable. The mob surged and gabbled, and grew constantly bigger. Wendelin delegated subordinates to look after his evening duties, and had lunch-boxes brought over to us. At 6:30 Chancellor Burkett arrived, and with him, Mayor Johnson. Both of them had already been acquainted with what had happened.

"I called on you," Wendelin said to the Chancellor, "because this is a situation in which many experts and specialists in various lines will be required. You are the best man to find the right people quickly, so that we might make an effort to understand these people, their machine, their language and their journey."

"Well, here's one of my experts right here," the Chancellor said, laying his hand on my arm: "He is pretty thoroughly acquainted with the deep places in the Universe."

I bowed acknowledgment. And we waited some more. It grew dark, and the airport's floodlights were turned loose upon the scene. Wendelin and I walked over into the empty space around the machine, and beckoned and made signs of welcome. But the silence of the tomb met our efforts.

Then, when it had become pitch dark, the door finally opened, the gangplank slid out, and two of the men in green silk pajamas walked heavily out. We stood hesitating until one of them made an unmistakable gesture, beckoning us to come; and then held up a hand with five fingers spread out.

"They want five of us to come over there," I suggested.

Wendelin and I, the Mayor and the Chancellor stepped forward. The Chancellor motioned to the burly police sergeant, and I also felt that he would be a good man to have along in case we needed physical assistance. The strangers repeated their beckoning gesture and retreated within the doorway.

"They want us inside," I said again.

The others eagerly followed me as I led the way up the gangplank. We found ourselves in an empty room, lighted by a bright globe. One of the strangers was directly in front of me, and I marvelled at the softness and lightness of his clothing, especially as compared with the clumsy, heavy woolen things we wore. Wendelin, in his baggy canvas coveralls, was the only one whose dress compared with theirs in the way of comfort. The stranger in front of me was a brisk, bright looking man of about forty, with power and intelligence showing in his face. He addressed himself to me, laying his hand on my shoulder, then motioning me with his hand, as though motioning me to watch what he was going to do. Then he touched a button and plunged the room into darkness.

Some of our group stirred and growled in suspicion. But in an instant the light was on again. Then my interlocutor pointed outdoors and made a sweeping, circular gesture—I surmised to indicate the outdoors; and again put the light out. He turned it on again promptly, and drew a small telescope out of his clothing. This he put to his eye and

looked intently upwards through it for a moment. Then he lowered it, pointed to the light globe; and shook his head and made a negative gesture with palms downward. Again he pointed out doors, and again put the light out.

Wendelin and I both spoke at once.

"Plain as daylight," Wendelin said.

"He wants us to put out the floodlights," I said. It is much more difficult to render his gestures in a written description, than it was to interpret them as we watched him. "The light interferes with their observations."

Wendelin—it was characteristic of him to be recklessly obliging—sprang to the door to give the order. The man from the machine took both my hands and shook them formally. Then he led me to his companion, who did the same. This was repeated with all the members of our party.

"Sort of an introduction, I suppose," I ventured. "From it I gather that we're going to be friends."

Just as the lights were extinguished outdoors and darkness closed over us, the two men in green beckoned us, and we followed them. Through long corridors, up metal stairways, it seemed interminable distance, they led us. Wendelin, who walked beside me, kept peering into all recesses and doors, turning his head as we went round corners, and craning his neck whenever we passed other silk-clad strangers. But we saw nothing of the beautiful girl! What a jolt he had gotten!

They Decide to Stay

FINALLY we reached the top. Here in a large room was a beautiful eight-inch telescope, mounted in a way that delighted my heart. The room was a marvelous astro-physical laboratory; many of the instruments looked quite familiar to me. At the telescope sat a man calling out strange words; at a table sat two men, one manipulating some sort of a calculating machine, another covering sheets of some sort of parchment with figures. All of them had on their faces that look of blank, hopeless perplexity, as though some terrific inexplicable event had overtaken them.

Instinctively I went over to look at the figures on the paper. Of course the symbols were utterly strange to me, but they were in orderly rows and columns. In a moment the calculation seemed to be finished, and the man with the papers announced the result. The others stood as if petrified. One of our conductors spoke a word or two of what seemed protest. The other pointed to the papers and made a gesture of finality.

It was several moments before they turned to us; and now, calm resignation showed in their faces. All of them looked and acted as though they had made some sort of a decision, perhaps to accept this strange fate that they could not understand.

The man who had first interviewed me, now confronted me again. He pointed to himself with an up and down gesture indicating his whole body; then likewise to me, and the same way to several of the other men, both in their party and ours.

"Zo yot ur?" he said, with a plain note of interrogation in his voice.

"Sounds like Sanskrit," the Chancellor whispered.

I subsequently heard the same query so many times that I learned it thoroughly. At the moment I did not at once comprehend. I stood in silence, wondering what he meant. So he took my hand and pointed to it, then to his hand, and repeated his:

"Zo yot ur?"

Then he pointed to the telescope, to the light globe, to the table, asking each time:

"Zo yot ur?"

Finally the light broke upon me. The change of expression on their faces to one of patient resignation, and now the queries in connection with common objects.

"They've decided to stay and learn our language!" I exclaimed. "He's asking the names of these things!"

"We'll have some of the Education people down here tomorrow," the Chancellor said, "Also a philology man to pick up their language."

"But, by the way they act," I continued, "they seem to think they have come to the wrong place. They look as though they hadn't expected to find things this way; but they've decided to stay anyhow and look into it."

Wendelin stood right behind me, and I heard a faint, involuntary sigh escape him.

CHAPTER V

The People from Outside

"DO you think," asked the Chancellor, of Professor Andrews, head of the School of Philology, "that we could get their story most quickly if we learned their language, or if we taught them ours?"

We were holding a little conference in the Chancellor's office. There were about a dozen of us from different departments of the University, and a representative from the Mayor's office. Gray and experienced veterans like Chancellor Burkett, and Fielding the astronomer, and young fellows like myself and Fahrenbruch the psychologist, all exchanged opinions and offered ideas and contributed wisdom or ingenuity, toward forming some sort of plan for handling our visitors in the proper manner. All of us were anxious to show them the utmost cordiality, and to be of all possible service to them; but none the less we were equally eager to learn their story, and find out where they had come from and how. It was difficult to keep our curiosity about them from dominating our entire attitude toward them. But we were unanimous in agreeing that hospitality must come first.

The Chancellor's query was not definitely answered just then; and it answered itself later. However, four of us were detailed to establish communication with our mystery-enshrouded visitors; we were to act as a sort of *liaison* committee, with Dubuque of the Education Department as chair-

man; and Andrews the philologist, Fielding the astronomer, and myself as members.

The next decision of the Chancellor's conference was to make an attempt to persuade our visitors to move their machine to the Midway, just beside the campus. Most of us who would have to come in contact with them daily, lived near the University, and would have to make long and tedious trips to the Cicero flying field. Obviously they had selected the airport as a landing place because it had appeared to be such an inviting location. We had no doubt that the machine could move itself with but little trouble. And there was plenty of room on the Midway.

It worked out beautifully. Our committee visited them the next morning, and were met by the same five people who had stepped out of the machine on the first occasion. I was selected as spokesman because the visitors already knew me. With pencil and paper in my hand, I indicated that I had something to communicate to them. I sketched a map of southern Chicago, putting in the landing field and their vehicle in one corner. I sketched its polyhedral character, and then pointed to it, around the room, at them, and to the floor. I looked at their faces to see if they understood, and they nodded comprehension. Then I sketched in the University, besides the broad Midway, and indicated with gestures the connection between ourselves and the University buildings. Again they nodded their understanding of my idea. Then it required but a simple gesture to indicate the moving of their vehicle to the Midway. The man who had made overtures to me the day before seemed to grasp it first, and rapidly explained it to the others. I could tell by the expressions in their faces that they acquiesced in the idea. So we conducted them to an airplane and flew them over to where the Midway lay, and showed them the resting place we had selected for them. They regarded our airplane with a curious interest; but it seemed to me that they did not consider it worthy of wonder or admiration. Possibly it looked as primitive to them as a rickshaw looks to us.

The moving of the vehicle was a spectacular performance. There was always more or less of a crowd of curious around their machine, beyond the ring of police. The space-travelers closed their door, having motioned us away and warned us by placing their hands across their eyes.

"Look out for the light!" I warned. The police shouted their warning to the people in the vicinity, protecting their own eyes with their hands. With my eyes closed and my hands over them, I was still conscious of a bright light, which lasted the merest instant and was gone. When I looked again, the huge, gloomy polyhedron was no longer there. Looking closely, I noted the vague area of emptiness that obstructed the view of the distant buildings. But in a moment that had thinned and cleared, and I could see the Ford Assembling Plant again, and the fence was in plain view all the way around the corner. When we arrived at the Midway, the machine was there, dark and ponderous on the lawns, with a ring of police holding off a chattering crowd.

We felt much more encouraged because we had gained the friendly confidence of the strangers and made ourselves understood sufficiently to have succeeded in securing their cooperation with our plans. It looked like a good beginning. We were further encouraged when they invited us into their machine and took us on a tour of inspection through it.

As sufficiently detailed descriptions of their vessel have been published by numerous writers, both popular and scientific, I shall omit such purely descriptive material in this account, which purports to be an interpretation of the significance of their achievement.

The word photon-ship seems to have been most widely used and accepted as an appellation for their vehicle; and the public knows all about the thirty people who came in it, the comfortable and luxurious living-quarters, with carpets, wall-hangings, couches, books, pictures, all giving the impression of an Oriental refined artistry; the solarium, the gymnasium, the swimming-pool, and all the ingenuity expended for the purpose of keeping up the health and morale of passengers who would have to remain confined within the vessel for a long time; the marvelous astrophysical laboratory, the solar motors, the huge electric generators and field-coils for transmuting elements.

Learning English

BUT there were things about the photon-ship that impressed me more than the engines did; and they were not conspicuous in the popular accounts. For instance, there was the freshness and newness about everything. A room lived in even for a week begins to have a sort of mellow, human air, a sort of slight disarrangement of the absolute order and finish which is evident in a perfectly new one. These people, no matter what terrific speed their machine attained, must have been on their way at least a month; and I couldn't see how it could possibly have been other than a good many months. Yet no room that we saw showed traces of a month's occupancy, of walking, sitting, handling, of dust, wear, etc. The machinery was new; enamel was intact, there were no traces of heat or oil; it looked as though it had hardly been run at all. The food supply room was full. There was food there for thirty people, for years it seemed. It had not been drawn upon at all. The people's clothing showed no signs of wear. The people themselves did not look fatigued as though from a long journey. They looked fresh, full of zest. Our gravity seemed just a little more than they were accustomed to, yet they seemed to be rapidly adjusting themselves to it.

Taken altogether, it looked as though they had not been on their way very long. Could they be from our own solar system? All our scientific knowledge prohibits such a possibility. Nowhere in our solar system do conditions prevail which could pro-

duce beings so perfectly like us. Yet, how explain these people otherwise? The mystery became so keen that we tried all sorts of artifices to ask them where they came from; but we did not succeed in making them understand our query until they had learned some English.

Their method of learning was certainly a high-speed one. The five people whom we had met on the first day were our direct pupils. Subsequently we noted that everything that these five learned each day was common property among the rest of the thirty by the next day. They evidently had efficient methods of transmitting knowledge as well as of acquiring it.

"What do you make of it?" Fahrenbruch asked me: "All of them drilling in English? Looks as though they meant to stay here some time, doesn't it?"

On the first day of instruction, the man who had previously taken the initiative with me—I shall call him by the name I subsequently learned for him: Addhu Puntreeahn—gently took a newspaper out of my pocket, asking permission with his eyes. He pointed to the first "T" in the title, *"The Chicago Tribune,"* and looked at me interrogatively: Surmising that he wanted the name or sound of the letter, I pronounced it for him. He nodded and noted it down in a little metal book. Similarly he noted down in rapid succession a couple of hundred words that I pronounced for him from the newspaper. Seeing what he was after, I wrote out the alphabet for him, giving him the sounds, which he noted down by a wiggly-looking symbol of his own. He then tried to pronounce words out of the newspaper. The results were amusing, as they naturally would be, for there is no logical system about English pronunciation. They were also embarrassing to me; I had to shake my head and repress an amused expression at each of his efforts.

Finally it dawned on him that there was something wrong with our alphabet or with our pronunciation. He tore out his notes and threw them in a waste-basket, and went over and spoke a few words to his companions. Then, in the same way as before, he asked me to pronounce entire words, and made notes. Carefully, I read for him a couple of columns, indicating each word for him with my finger, while he made notes. When this was done, he read out of his notebook to me: "Real Estate Interests Pushing New Subway Project," and "New Peace Agreement in the Orient," with an excellent pronunciation, though as yet he did not know what the words meant. But he pronounced them almost exactly as I had done. Obviously they had a highly perfected phonetic system of recording sounds. He separated his words more than one would in conversation, and there was a slight broadening of the vowels and softening of the consonants, such as one hears in the English of a cultured Japanese or Hindoo.

Then he rapidly inquired for a couple of hundred verbs; such as "walk," by walking and asking:

"Zo yot ur?"

His companions were also busy pumping our committee and filling their notebooks.

On the morning of the second day, Addhu said to me:

"Today we speak more in words, less in signs."

He seemed pleased at my astonishment. His pronunciation was correct; somewhat too much so. But he reproduced our Mid-Western accent quite faithfully. And he proceeded to ask me, one after another:

"What is the word for one period of the earth's revolution around the sun?" All of these words were concrete words which could be learned by signs, and had evidently been picked up either by himself or his companions; and he was progressing toward abstract ideas.

"A year," I replied.

"You are on this earth; everything you do, you do on the earth. What is the word for that?"

"You mean that I *live* on this earth?"

"Ah yes. You are very intelligent indeed. You also *live* in this city? Is that correct? Then, what is a place where you live?"

"My *home!*" I tried.

And so, building up from known words to unknown, from concrete to abstract, from words to sentences, he kept climbing and building up, always noting everything in his book. The others were busily doing the same, acquiring a vast store of our language, which in the evening they would distribute among themselves.

From the Moon!

ONE morning three weeks after they had come they were talking to us in English. They spoke slowly and carefully in calculated sentences, stopping to think frequently. But the English was correct, the pronunciation was correct, and our understanding perfect. I was the one who sprung the bomb.

"We can understand each other fairly well, now," I said. "I cannot wait any longer to ask you from what planet you came to the earth?"

The whole group heard it. Our committee was aghast at my temerity, but listened in eager breathlessness. The visitors seemed struck dumb for a moment. Again they looked puzzled. No one seemed to know just what to say. Finally Addhu said:

"We came from the moon!"

Everyone in our party started in surprise, and then stared in silence:

"What moon? Our moon?" Fielding shrieked, as though in accusation.

The visitors all nodded.

"Ah yes," I said. "I know. We saw you stop at the moon. But to the moon, from where did you come?"

"Only from the moon," Addhu said, wrinkling his brows.

"Your machine can travel faster and farther than that," I suggested. "The distance from here to the moon is a mere footstep for it."

"You are right. We did travel fast and far," Addhu answered slowly, with a deep reverent tone, as though not yet over all of his former astonishment.

"Where? Where?" asked several of our committee in unison.

Addhu made a gesture of despair.

"I do not yet know enough of your language to explain," he said.

"Draw it, and show us," Fielding suggested, and began to sketch the solar system.

"I cannot even do that. Drawing gives us two dimensions. Our journey involved four dimensions."

"But," the Chancellor urged, "there is no civilization on the moon capable of building a ship like yours. We know that much." Fielding's question had been asked from an astronomer's standpoint, whereas Chancellor Burkett remained true to form as the excellent historian that he was.

"Alas, you are right. There is not." There was a strange break in Addhu's voice: "We shall try hard to learn the vocabulary of your sciences, so that we may explain to you as soon as possible. In a week, perhaps, we can explain."

Suddenly one morning the young woman who had lavished the mistaken greeting on Wendelin, spoke to me. She and her companion in pink had both been in the English study class every day. She, the blue-clad one, was the daughter of the expedition's commandant, and her name, as near as I can manage to write their words, was Vayill Dhorgouravhad. I had come to know her by sight pretty thoroughly. She always wore blue, while the other young woman, who was the wife of one of the men, had varied her costume several times already. Vayill's hair was a blue-black, and her eyes were a very dark blue, whereas the other's had a tendency to brown. Vayill had a tendency to be sad, melancholy, self-contained; the other one was always gay and enthusiastic. But, Vayill was the more interesting of the two; she glowed with intelligence, and many little signs showed me that she was a very determined little character.

"Where is the gentleman who was with you the first day?" she asked, coloring a little under her very excellent self-possession. "I have not seen him since, and I should like to."

"Well, there won't be any trouble about that!" I exclaimed with an enthusiasm that might have surprised her: "I'll bring him this afternoon."

Wendelin jumped out of his chair when I told him. He walked swiftly around the room a couple of times, and then threw off his coat and proceeded to shave. After careful study, he laid out the niftiest of Norfolk suits, and an elegant combination of necktie, shirt, and handkerchief. He was quite unconscious of his eagerness, as he hurried me toward the photon-ship. I couldn't resist the temptation.

"I never knew your former sweetheart," I said. "Was she quick and determined, and did she dress in blue a good deal; dark hair, and a mind as intelligent as they make 'em?"

"Why, er——" he paused meditatively, and looked at me. Then he noticed the expression on my face.

"Aw, go to hell!" he growled, and refused to speak to me any more for the rest of the walk.

When the two young people faced each other in that roomful of human commotion, they were a little constrained and hesitant. The girl was inclined to flush and look the other way, and Wendelin to be awkward and embarrassed. But, with a fine courage, she stepped forward and spoke to him.

"I want to tell you that I am sorry for my behavior on that first day," she began.

"Oh, not at all! Oh, that's all right!" Wendelin stammered. The rest of us made a show of turning away and occupying ourselves with something else.

"I thought you were——" her voice broke just a little: "You looked so much like——" her eyelids fluttered rapidly, and a little redness spread around them.

"How do you like this Earth of ours?" Wendelin asked briskly, in a matter-of-fact tone. I have said before that there is nothing the matter with his method of handling people, though externally he appears stolid. In another five minutes he had arranged with her to take her out in his car and show her the city. Ten minutes after that, he was gone. Before we left, a blue-suited woman from Marshall Field's had driven up in a Ford coupé and was measing Vayill for some apparel in which she could appear in public places. It was a highly delighted Vayill the next afternoon who, stepping in unfamiliar high-heeled shoes, walked down the gangplank, and took her place beside the beaming Wendelin in his yellow roadster.

During the coming week, Wendelin was in the photon-ship several times, and Vayill wore Marshall Field things and rode in the roadster more than once. However, the rest of the visitors also got rides and clothes. The *Tribune* voiced the suggestion on its editorial page, and in two days there were funds enough pouring in to dress up a hundred people like dukes. I spent an afternoon driving around Addhu and Drahnapa Dhorgouravhad, the old commandant.

"What do you think of the city?" I asked as I brought them back.

"I hardly know what to say," the old man pondered. They were now speaking English fluently. "It is interesting, certainly. But, what a haphazard scramble. No plan, no system——". He trailed off, feeling that he had already said too much for courtesy.

On the thirtieth day after their arrival, Addhu, who seemed to be a sort of adjutant, announced that they were ready to tell their story. They not only felt that they had sufficient command of the English language; but they had had the opportunity to clear up some of the mysteries that they themselves had not at first fully comprehended. They felt that they could now make it all clear to us. They suggested that we invite about fifty of our scientific men to an informal meeting, to be held in some lecture-room

where there were blackboards, charts, globes, and other such necessities.

His story was as follows:

* * * *

CHAPTER VI

Why They Were Surprised

WE are of the same race as you; we have a common origin and a common ancestry with you. Because of a most unusual occurrence, which, however, is quite in accord with well-known principles of Nature, you are vastly further removed from these ancestors than we are. We resemble them accurately; and they looked exactly like us. You have changed a great deal—I refer now to the aggregate of your race, as far as I can judge it by the people of this city. These human changes are intensely interesting; during the thousands of years that have passed, the human race must have had some strange biological adventures.

In order to show you our common birthplace, I shall use this globe, representing the Earth. Your ancestors and mine lived on a continent about the size of this one, here called Australia, and situated to the north and east of Australia, in about the middle of this ocean, the Pacific, where now there is no land except a few scattered islands. The Earth, as our ancestors know it, looked very little like this globe. It was mostly water. All the land in your Western Hemisphere was a line of bleak islands from the northwest to the southeast. There was a large fertile island in what is now the middle of Asia. And then there was the continent of Mo, where our ancestors lived.

A hundred years before the Great Catastrophe occurred, our ancestors had predicted it. For a century they expected it and were preparing for it. The regular coincidence of the solar tides and of the natural free period of vibration of the Earth* created an immense stress, right in the region of the only inhabited and inhabitable portion of the globe. The people of *Mo* colonized the large northern island of *His*, took precautions against the constant and terrific earthquakes, and prepared to endure the sudden shocks and atmospheric changes that they expected.

We had perfect records of this period. Our ancestors evidently took infinite pains to make their records clear and permanent and to safeguard them against destruction. Therefore, there were in our libraries accurate and vivid accounts of the Great Catastrophe, written on the spot and at the time, by people who saw and felt and experienced it all. Reading these accounts sends cold shivers through one's body, prickles the skin and raises the hair in horror. Man is a fragile and helpless mite among the huge, roaring, cataclysmic powers of Nature, swept aside like a dry-leaf in a hurricane. Winds, waters, earthquakes, and electrical phenomena all broke lose at once and created an abysmal chaos on a scale so vast and terrible that it is difficult to understand how any human being survived it.

Only in chambers hundreds of feet down in solid rock, prepared generations in advance, was it possible to live at all. There the people spent terrific days, buffeted and banged hither and thither as though all of them had been dumped into a huge churn. The whole continent heaved and quaked. People were intensely ill most of the time, in the throes of utter terror, suffering for lack of air; and after some days only partly conscious, so that they were no longer aware of the din and the heaving.

Finally, with the coming of consciousness, they awoke to a perfect peace and quiet, a strange physical lightness, a tightness across the chest and a difficulty in breathing. Those who made their way slowly out of the burrows, over countless prostrate bodies and out into the open air, and saw the oddly foreshortened horizon, felt the terrific heat in the sun and the icy cold in the shade, who saw the majestic, brilliant sphere filling a vast portion of the darkened sky—they suddenly realized that the expected had happened. The land of *Mo* had broken off from Mother Earth and flung out into space; it was now spinning around her as a satellite. Forever separated from their native planet, which now floated up there in the sky with strange, new continents visible on it, they were now inhabitants of the Moon, a new institution in the solar system.

This all happened thousands of years before I and my fellow-travellers were born. At first our little salvaged fragment of civilization had a difficult time. Half of them were killed by the shock of the Great Catastrophe; there were millions of dead. Much of the machinery and supplies that had been accumulated against the emergency, were destroyed. Yet, the people of *Mo* were the better off of the two terrestrial settlements. Their telescopes showed them that the island of *His* was now the center of a vast continent; but that it had been swept by huge tidal waves, and its civilization destroyed. Through the centuries they observed the region of *His*, and eventually learned that men lived there, our people, our brothers. But their numbers were pitifully few, and they had been cast back into savagery of the most primitive kind. Complete destruction of their civilization had thrown them on their bare hands. How grateful it makes us feel, seeing you, to realize that men eventually climbed out of that savagery, and redeemed their civilized status.

Within a thousand years, our moon people had recovered from their material damage, made good their numerical losses, and become fairly well adapted to their altered physical environment. And they had begun to forge ahead again and make material and scientific progress.

The progress made by our civilization on the moon was very swift. Knowledge, intelligence, skill, and technology advanced more rapidly than they had ever grown in Earth civilization, either before or since. There was a reason for this: the stimulus of necessity. We knew that the period of habitability of the Moon for the human race was limited. Scientists observed that it was losing its

* Author's footnote: The theory of George Darwin.

atmosphere and cooling rapidly, and that some day —relatively soon in astronomical terms—the Moon could not support human life. The race would have to die out or move away.

A Daring Plan

A THOUSAND years after the birth of the Moon, and when we thirty space travelers were living there, conditions had already become less comfortable than they had originally been. The cold was objectionable and breathing was difficult. We had developed red blood-corpuscle counts of eight to ten million per cubic millimeter, and haemoglobin percentages of 150 to 200; our normal respiratory rate was 40 and our normal pulse rate, 120. Our compensatory training in forced respiration was beginning to be inadequate*. Science was striving desperately for some method of prolonging the life of the human race and the duration of civilization. Naturally, our eyes were turned toward the Earth. There was plenty of land there now, and only a few tribes of the most primitive kinds of savages. It was a wonderful opportunity. If we could only get there somehow.

In respect to mechanical progress we had possibly not reached the stage you have now; you are ahead of us in transportation, in flying in the air and digging in the ground, in making vast quantities of machines and other articles. But, in scientific thought we had outdistanced you considerably. We had a fair grasp of the Universe and of our place in it, whereas you still seem to be struggling in the darkness of confusion.

However, you are making excellent progress. For instance, you are beginning to realize that gravitation is not a mystic "force" but merely the relative state of a body by virtue of its remaining on a world-line. It has already come to your attention that light, heat, electricity, and other forms of energy are not continuous effects, but occur as definite units or corpuscles. It is still a little difficult for you to comprehend *time*, but it is gradually dawning on you that time is not an absolute entity; for most physical processes can go equally well in both directions, except where *entropy* is involved; therefore that entropy determines the direction of the time-coordinate. You are making encouraging progress in the understanding of *space*; you are beginning to see that space cannot be adequately understood on the basis of elementary geometry; that it is curved in the neighborhood of material particles and flat only at an infinite distance from matter.

Of course, *space* was of especially vital interest to us. Somehow, to save our racial life, we would have to get out into space, and traverse it. So, we had thoroughly developed ideas of space which you are just beginning to grasp. We were thoroughly familiar with the idea of the Universe as the curved, three-dimensional surface of a four-dimensional sphere. We live in and comprehend only the three dimensions of the surface, just as you might imagine two-dimensional beings living on the curved, two-dimensional surface of the Earth, a three-dimensional sphere. The two-dimensional beings would deduce the third dimension, but they could not perceive it nor be conscious of it.

This brings us down to the work of my own group, which is now in your midst. We are the ones who conceived the idea of *circumnavigating the Universe*, and carried it out. Mathematics is clear on this point: if you start out in space and travel in a straight line, you will eventually get back to your starting-point. That ought to be quite clear from the two-dimensional analogy of circumnavigating the surface of the Earth, by going ahead continually in a straight line.

The material problems of circumnavigating the Universe were solved by six men of our group. Of course their work gave us the means of travel from the Moon to the Earth—our long sought-for goal. This part of the problem was, however, turned over to other workers. We went on with the pure-science problem of circumnavigating the Universe. Whether the others have ever succeeded in getting to the Earth or not, we have never learned.

Two of our group were mathematicians, who worked out the equations for the relationship between *electrons* (or matter corpuscles) and *photons* (or light corpuscles)* Four others were physicists who confirmed the mathematical hypothesis experimentally; who carried out in the laboratory the transmutation of electrons into photons and vice versa, that mathematics had shown to be possible; and who worked out the *integration* of photons into "mass", and produced "matter" made of photons or light corpuscles, analogous to matter made of electrons.

They built up a series of "elements" out of photons, with a regular Periodic System, analogous to that of the chemical elements. So far, they had produced sixty-seven *light-elements*, and marvelous substances some of them are. At the lower end of the Periodic System they are not visible at all; at the upper they are quite too bright for human eyes. They do not fulfill the electro-magnetic-gravitational equations**, nor are the tensors*** applicable to them. They do not follow geodesics and are not subject to the action of electricity and gravitation.

It was of these elements that substances were evolved that could float on a light-wave, and were used for building our ship to circumnavigate the Universe. A light wave is not, as many of your scientists still seem to think, a beam of corpuscles traveling in one direction. The only thing that travels in a constant direction, is the *front* or *peak* of the level of energy; just as a wave in water moves forward, though the particles of water do not

* Author's footnote: *Physiology at Low Barometric Pressures*, Editorial, Journal of the American Medical Association, Volume 93, No. 8, August 24, 1929, page 613.

* Author's footnote: Compton, Arthur D. *What Is Light*. The Scientific Monthly, April 1929, page 289.

** The equations of Maxwell and of Weyl.

*** The Ri-mann-Christoffel tensors.

move forward, but merely up and down. But, the water wave can carry forward a stick, or something light enough to float on it, with great speed.

Our photon-elements can float on a light wave, and are carried forward with the speed of a light-wave (186,000 miles per second), even though the photons do not have that velocity. In practice we found that our photon vehicle was carried with a speed slightly less than that of light. Had the speed of our vehicle been equal to that of light, it seems to us as we think back, our adventures might have been far different. And, as our photon-elements do not follow world-lines of geodesics, they are not subject to the laws of electricity or gravitation.

Transmutation!

THE idea of circumnavigating the Universe took shape as the means for accomplishing it were built up. It was the most brilliant and courageous project that the human brain had ever conceived. The tremendously discouraging feature of it was that even at the speed of light, it would take one hundred million years to make the trip. We got around that difficulty in two ways. The first was to select a "high latitude" for the trip, and thus shorten it; just as you may travel around the Earth in less distance on the Arctic Circle than at the Equator. The second—as it would take a century or more anyway—was to go in a ship large enough and with a group numerous enough, to be self-sufficient. Thus, several generations would live and die in our ship before it came back. It was a bold idea, but we were all prepared to do it; to start out and spend our lives in space, destining our children and our children's children to do the same, until some remote generation of our descendants would get back home.

It took a hundred years to build the ship and perfect our plans. The ship that we made, you have seen. One important item of the equipment we did not show you: the automatic signal to give warning when the ship got back to the solar system. We reasoned that the ship would be traveling at such speed that it would be very difficult to get bearings and determine location. Therefore, in order that the occupants might know for certain that they were back at the solar system, we devised an apparatus which I think is very ingenious. Telescopic images of the constellations operate a grid-glow tube when just the proper configuration occurs, and to check it and make it doubly certain, an image of the solar spectrum operates another grid-glow-tube. The grid-glow tubes sound bells and turn on lights. Once set, the apparatus requires no further attention, and remains on guard for hundreds of years, absolutely dependable to raise the alarm and light up the vessel as soon as it got within the confines of the solar system. We could picture what a happy day it would be for our descendants when the bells began to ring and the lights went on. The ship could then come to an automatic stop by means of the transmutation apparatus.

By far the largest portion of the machinery that you saw is needed, not for propelling the ship, but for transmuting the electron-elements and photon-elements back and forth, one into the other. The photon-elements are inconvenient to handle and disconcerting to live among. The electron-elements obey gravitation and are visible. Also, stopping the movement of the ship depends upon changing from photon-elements to electron-elements; that causes the ship to become incapable of floating on the light wave, and it "sinks", if I may speak of it that way. This transmutation is an intricate, in many respects a clumsy affair, and is accomplished by completely rearranging the equilibrium between electrons and protons on the one hand and photons and protons on the other hand. You have seen the brilliant and bizarre effects that occur when we operate these transmutations.

All of us in the ship are married couples, except the commandant, who is a widower, and his daughter. Poor Vayill! The start of our ship from the moon, such a festive occasion for our whole race, was a tragedy for her. On the day before the start she was to be married to a young engineer—who was the perfect physical counterpart of your airman yonder, Mr. Wendelin. But on that day he suddenly fell ill of a cosmic-ray burn, so frequent and so fatal among our moon people. Of course he would have to be left behind.

Vayill had to make a quick decision. The start of the ship could not be delayed for one or two people. It was a sight to rend the hearts of the stoutest of us, as she trembled there in the pallor of indecision. Two or three hours she spent thus. Suddenly she straightened up and set her lips. She shut herself up with her lover for an hour. Then she came into the ship and announced that she was ready to go.

"I told him good-bye," she said. "We should have had to part soon anyway, as he cannot live long. There is nothing to serve by my remaining here. We talked it over. He wanted me to go."

Her eyes closed several times, trying to hold back the tears, and the rest of us turned away, lest we betray our weakness.

The next day we closed and sealed the door and threw the switches. There had been ceremonies and ovations, speeches, flags and parades, all very embarrassing and tedious to us. Now it was over. The motors were humming.

That was what our start was like. We looked out of our windows, but there was no chance to take a good-bye look at our home. Everything disappeared instantly. Outside our windows there was just a blank. We could see nothing. Of course, it was because of our speed—as we thought then. On all sides of us was a gray emptiness.

I remember every second of that trip. There were four of us at one of the windows. We stood looking in the direction in which the moon city had been visible a few instants ago. Now there was a gray blank. We talked a while, rather astonished that we could see no stars. We had expected to go

rapidly past wonderful constellations, and had hoped that the sight of them would be a recompense for the deadly monotony of the trip. We discussed one or two possible causes of the phenomenon. We spent fifteen minutes at the window. Then we walked into the general living-room.

As soon as we arrived there, we decided that we were hungry. That was not surprising. Now that we had suddenly relaxed, the fatigue of the strain of the past days was apparent. What was more natural or human than to want to eat at such a time?

Several days passed.

Then suddenly, one day the gongs clanged! The whole ship was filled with their ringing, and in each room and corridor the signal lights blazed out.

"The signal!" we gasped, one and all. "Something has gone wrong!"

At least, the automatic machinery had done its duty. The ship had stopped (relatively speaking, of course). We could see the stars out of the window. And we were chagrined because so early on the voyage the machinery had proved untrustworthy, and were puzzled as to how long we could continue to have confidence in it. Eagerly, however, we looked out to see where we were, how far the first jump had gotten us.

The Dead World

THE signal had worked correctly! It was set to operate when we were within the solar system, and that is how it had worked. Only a few hasty observations were needed to identify the sun, several of the familiar planets, the Earth, and especially our home the Moon. Then we saw our observer gasp and turn pale, with his telescope turned toward the Moon. He did not reply to our anxious queries. He could not speak.

I was the first one to push him aside and look. Eagerly I put my eye to the telescope to get a glimpse of that home, across those empty miles of space. My blood froze to ice! What was that I saw? No blue seas! No green lands! No dotting cities! No refractile envelope, no atmosphere! A cold, frozen, lifeless Moon! Things turned black before me.

Doubtless your telescopes watched us approach the little world where we had lived, where we had left all our people and cities and the civilization dear to us. You saw us circle round, but you can not imagine the chill horror in our hearts as we gazed upon that bleak lifeless picture, or the terrible, swirling chaos in our minds, gasping, groping to understand what had suddenly happened in those few minutes. How any of us preserved our sanity, I do not know. It is a wonder that a ball filled with gibbering lunatics did not descend to this Earth, in place of us.

Then, we looked toward the Earth, and located the new lands that had appeared out of the waters, the countless cities, the numerous evidences of an advanced and teeming civilization that had sprung up, and again our senses reeled. What should we do?

There was only one answer. The Moon was dead. What had become of our race, no one knew. On the Earth were civilized people. We could not endure the suspense of remaining in space any longer. We must land on the Earth. We selected a portion of the land that seemed the most progressive and developed, chose the largest of its centrally-located cities, and looked for a landing-spot.

To see your spreading civilization was a shock of astonishment to us. To see yourselves, your faces, your resemblance to us—was enough to daze us completely. Is it any wonder that poor Vayill was confused, and thought Mr. Wendelin was her fiancé? We were too puzzled, too confused to know what to do. To gain time to think, we sought refuge in our ship.

We decided to wait until evening and check up on the constellations. Our observations and calculations showed us that radical changes had taken place in the configurations of the stars since we had last observed them, and that these changes must have required not less than two hundred thousand years of time!

* * * *

CHAPTER VIII

The Fitzgerald Contraction*

THERE was an expression of perplexed amazement on the face of Chancellor Burkett, as Addhu paused. The Chancellor turned his head from side to side, looking into peoples' faces. Then he turned to Addhu:

"But, I do not understand," he said, in a protesting sort of voice: "Or perhaps I did not hear you right. How long—I got the impression that you were in the proton-ship, as you call it, only a few days altogether."

He stopped in perplexity.

"Our voyage lasted three days and a half by our watches," Addhu said. There was a queer smile on his face.

"Well, then," broke in Fahrenbruch the psychologist, "what's this about two hundred thousand years? How do you put that together?

Addhu made as if to speak again, when the Chancellor turned toward me.

"You look as if this meant something to you," he

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* Author's footnote: The physical, astronomical, and mathematical conception on which this story is based, are so recent that they have not yet become widely distributed among amateur scientific readers. I am therefore appending a list of books from which the non-technical reader may become acquainted with them. The list is arranged in the order of difficulty, the easiest and most elementary works coming first.

Serviss, Garrett P., *The Einstein Theory of Relativity*, Edwin Miles Fadman, Inc., New York, 1923.

Einstein, Albert, *Relativity, The Special and General Theory*, Henry Holt & Co., New York, 1921.

Eddington, A. S., *The Nature of the Physical World*, MacMillan Co., New York, 1929.

Eddington, A. S., *Space, Time, and Gravitation*, Cambridge University Press, 1921.

d'Abro, A., *The Evolution of Scientific Thought*, Boni & Liveright, New York, 1927.

Steinmetz, Charles P., *Relativity and Space*, McGraw-Hill.

said to me: "Tell me at once, what kind of a hoax is it?"

In truth, a light had suddenly dawned on me. Across the aisle I could see old Fielding, the astronomer; his brows went up and he smiled. He also understood.

"The Fitzgerald Contraction!" Fielding and I exclaimed in the same breath.

A pleased smile beamed on the face of Addhu.

"Your scientists are very clever," he said to the audience as a whole: "Quite promptly they have surmised what happened. Just as we did, as soon as we had confirmed the facts that I have just told you."

"Utter impossibility!" Chancellor Burkett said impatiently. The Chancellor had been professor of history before he had assumed the reins of the university. He had a good scientific head on him, but merely was not posted on modern mathematical physics. His attitude was quite the natural attitude of the educated, intelligent man everywhere toward the phenomena of Relativity. Only those who become quite thoroughly acquainted with these phenomena can cease to regard them as ridiculous.

"Either this is some sort of a silly hoax," exclaimed the Chancellor, "or, due to the recent excitement, there are some candidates here for the State Psychopathic——"

"I can explain it all, sir," I volunteered.

He looked at me skeptically.

"It is quite in accordance with a well-known natural law," I said. "Beforehand, I should never have thought of such a thing, just as they seemed to have completely failed to anticipate it. But, in the retrospect, it is just what one ought to have expected from theoretical considerations; in fact a beautiful experimental verification of a theory that has become fairly familiar in these days of Relativity."

The Chancellor nodded to indicate that he was listening. Others craned their necks; so I stood up that they might hear. I assumed my best lecture-room air.

"The fact that the voyagers felt that they had been on the way only three and a half days, whereas two hundred thousand years had actually elapsed while they were absent from this region, is perfectly explained by Fitzgerald's hypothesis of the contraction of a moving body. This hypothesis is one of the many startling things in the modern theory of Relativity, which Einstein has recently made so famous. This hypothesis states that a moving body is shortened in the direction of its motion; its new length is given by the expression: $L = \sqrt{1 - V^2}$, where V is its velocity expressed as a fraction of the velocity of light.

"The original experimental evidence that put our scientists on the track of this hypothesis was obtained in the famous experiment of Michelson and Morley as far back as 1887, in which they attempted to determine ether-drift. It was repeated with much greater accuracy by Morely and Miller in 1905. The *contraction* explanation of the phenomena as observed, was proposed by Fitzgerald, and rendered very plausible by the theoretical researches of Larmor and Lorentz.

"All the attributes of the moving body are decreased or contracted, by the amount indicated in the formula. Thus, if a clock were traveling at the velocity of 161,000 miles per second, its diameter to us will be *reduced to one-half of its original diameter*, and its hands to us will move at *one-half their former rate*; time will, for that moving clock, go only half as fast as for us stationary folks. If a man moves at that velocity, his breathing, heart-beat, his perception of objects not in motion, and of time, will be reduced one-half. But, he cannot see his own shortening, nor be conscious of it; for his retina is shortened by one-half and exactly compensates for the shortening, so he looks natural to himself.

"At ordinary velocities, such as we experience here, the contraction is too minute to be detectable by experimental means. But at velocities like those of the celestial bodies, the effect is quite apparent. At the velocity attained by our guests, which was but slightly less than that of light, the effect must have been tremendous. Their length, the length of the photon-ship and of everything in it, must have been almost zero in the direction of their travel; they must have been a thin, flat wafer, invisible to ordinary observation. But they did not know it. Their measuring scales and rulers were all reduced by the same amount, and still measured true. The retinae of their eyes, the tactile nerve-endings in their fingers, were all equally contracted, and saw and felt everything the same as before. There was no way of detecting the change. To them everything looked natural.

A Honeymoon In Space

"LIKEWISE, while their chronology had decreased to $\sqrt{1 - V^2}$, which was almost zero, because V^2 was almost equal to 1, they detected no change, because the rate of their clocks and watches was slowed down the same amount. All of their physical activities slowed down similarly; consequently they lived at so slow a rate that three and a half of their days were equivalent to two hundred thousand of our years.

"They must have reached the limit of our own galaxy, turned around because of some unknown forces, and returned to the solar system.

"Their high velocity is the sole explanation of why, during a period of relatively few days to them, their entire race became extinct, the Moon on which they had lived became dead and cold; while on Earth, continents were built up, and new races sprung up and became civilized.

"But they are to be envied their experience. They are all the richer for it, and with a little adjustment, will be perfectly well off in our world. They have been welcomed among us, and will all find their places and become valuable members of the social order. In fact, in this country, if they do not mind a little blatant publicity, a little talking on the

(*Concluded on Page 744*)

The Red Dimension

by Ed Earl Repp

Illustration by Winter

The insect came on without hesitation, its needle-tipped natural weapon aimed at the towering creature. There was a whining hiss and from the fan-like, spear-shaped weapon shot a sudden beam.

By the Author of "The Metal World," "The Radium Pool," "The Stellar Missile," etc.

A PARTY of Russian engineers surveying a desolate part of Siberia came one day upon the body of a man. He had evidently been dead for quite some time and, from the wasted face and limbs, it was concluded he had died from starvation. He carried in his pocket among other things a small pouch in which were found some dirty sheafs of paper on which was scrawled what follows. The thing had little interest for the surveyors and it was my good fortune in being an invited member of the party that gave me possession of the papers. Subsequently, I tried to verify the statements made in the manuscript and failed. Though I hunted through countless volumes of the records of Russian courts, I ran across no mention of a Doctor Ivan Korsakoff, or the trial of Arnoldi Kherkoff. Whether this story was only the raving of the poor wretch who was found dead, or whether it had a basis in fact far beyond my ability to discover, I cannot say. I must present the manuscript intact as I translated it, and leave it to my readers to judge—Ed Earl Repp.

ED EARL REPP

* * *

How I hope to succeed in getting the following narrative to the world is a secret which I never will reveal. Should the channels through which it may reach you be disclosed, then the hands of my jailers would forever seal the lips of those who aided me in giving to the world the true facts of the strange case of my life-long friend and benefactor, Dr. Ivan Korsakoff.

Few people will remember the case. It was given some prominence at the time that the events occurred; but the details were soon forgotten in the frenzied excitement of war and the dethroning of the Romanoffs. In brief, let me say that I was convicted on circumstantial evidence of having done away with the famous scientist. The evidence I brought in my favor had no effect and I was forthwith sentenced to life imprisonment in a pest-hole in Siberia.

For years I lived in the hope that the truth of Dr. Korsakoff's case might become known. But the passing of years have made me an old man—although I'm only forty—and have caused me to wish that I had received a death penalty. For life has been unbearable! Even now, I lie in a bed of filth praying for a humane hand to relieve me of the burden of life.

Perhaps you will be inclined to doubt me when I say I am still confined in a filthy prison camp. You probably believe that such confinement for criminals has been abandoned by every civilized nation in the world. Let me destroy that belief. In the wastes of Siberia, forgotten by the world, I am destined to remain for the rest of my natural life! Siberian prison camps were the pets of Russian monarchy in the early days. Mine was the most accursed of all, being visited only on rare occasions to receive prisoners and scant supplies. If civilization has actually abolished these places of lingering death; then mine must have been overlooked and forgotten when the Romanoffs met their fate and the monarchy was overthrown! But the place still exists. Where, I do not know—nor does any other of my pestilence-stricken fellow prisoners.

A DEEP-SEA fish living in his natural element, water, may very well believe that the whole universe is a vast ocean. He could not conceive of different planes of existence or of different elements. It is the same with us. It is most difficult for us to conceive of different planes than that in which we exist and live; and still more difficult is it for us to believe that in other dimensions surrounding us and through us other beings live and have their being.

Yet, the thing is not as absurd as we imagine—particularly when more and more evidence is brought to bear upon us each year proving that we hear, see and feel little of all that which is going on around us. There are titanic sounds which we cannot hear. There are radiations which we cannot either see or feel; and we are totally unaware of them.

To bring those other dimensions to us our author wrote this most intensely interesting story. It will hold you breathless throughout.

The Magic Goggles

IT is not my intention to dwell too long on the horrible details of confinement here. My main object before I answer the Hand that beckons is to give the world the fact regarding dear Dr. Korsakoff. But first let me tell you who I am. My name is Arnoldi Kherkoff, and I, until my arrest, had hoped to become a great scientist. When I was but four years of age, my parents disappeared strangely. I was left alone—deserted. It was then that Dr. Korsakoff found me wandering aimlessly through the snow-clad streets of Moscow, ravenous, terrified and frost-bitten. He took me at once to his home. I became his ward and lived with him until the end. He showered me with everything that wealth could offer.

As I grew older, I in turn helped him in his laboratory and learned much about optics and other branches of physics and obtained an inkling of the dimensions beyond ours. Dr. Korsakoff began to

discuss his various experiments with me when I reached eighteen. I was delighted, because it was a sign that I was progressing in the sciences. He could converse with me and receive intelligent replies; and he trusted me not to disclose the nature of his experiments to others.

One day Dr. Korsakoff approached me and laid an affectionate hand upon my shoulder. I looked up from a book I was reading. His face was aglow with excitement and his hand trembled. I surveyed him with alarm, for I felt that excessive work was beginning to affect him. He glanced at the book which now lay closed on my lap.

"I am pleased to see you reading the treatises in that book, Arnold," he said, beaming: "How far have you gone?"

"I've reached the chapters that explain Dr. Valenev's magic goggles, sir," I replied, regarding him curiously: "The second chapter tells how he managed to see into an alien dimension. Quite interesting reading matter, sir, but rather fantastic. It sounds impossible."

His hands became still and apparently nerveless. Then his strong fingers sank into the flesh covering my shoulder blade. He seemed tense.

"It is somewhat fantastic, Arnoldi," he said slowly, "but not as impossible as one might think."

"What, sir?" I asked, interested. "Those magic spectacles not impossible?"

"Quite so, my son. It is not at all impossible to see into other planes of life through er-er magic glasses."

"I've never heard of anyone ever doing it except in this book, sir," I protested. "And the experiences set down here sound more like fiction than actual fact. Who was this Dr. Valenev, anyhow?"

"Valenev?" Dr. Korsakoff said, brows arching: "Have I neglected to recount his life to you?"

"Rather I have neglected reading his works, sir," I replied.

"Vladimir Valenev, Arnoldi, was one of the very first Russians to take up the practice and study of optometry in the early days. He was actually the father of the profession in Russia. But his startling discoveries branded him as a fool and he was discredited by the church and state. He was eventually strung up by the thumbs in old St. Petersburg for an exhibition of black magic. Most of his statements were without concrete foundation, and they led him presently to his death. Yet for all that, Arnoldi, have you ever thought it might be possible to create a pair of spectacles through which one could see into the beyond?"

I stiffened in the chair and the heavy book thumped on the floor. I surveyed his serious features for a sign that he was jesting.

"I've never thought of such a thing, sir," I said, shaking my head. "In fact I do think it is quite impossible with any glass or series of glasses which we have today."

"Naturally, Arnoldi," he said, "it could not be done with our present chromatic glasses. Yet it *is* possible to penetrate the beyond—the planes of existence beyond our own."

"What do you mean, sir?" I asked.

"You already know that we exist in a world that wise scientists realize is very limited. Atomic vibration, my dear Arnoldi, has created a varied series of planes of existence, to which the human retina and the human auditory organs are totally out of accord. That is—everything vibrating within the perceptions of our own immediate powers of sense manifests itself in the form of concrete material matter, such as myself and yourself and objects in this room, perceptible by sound, sight, smell, touch, and so forth. Everything below or extremely above our accustomed vibratory limits is to us non-existent. You are aware that there are sounds so high in pitch or frequency that the human auditory system cannot hear them. Also there are objects that emit light vibrations whose low frequency makes them invisible to the eye."

"You have taught me to understand that, sir," I replied, beginning to have a dim awed feeling of what was to come. Surely he had not evolved a pair of glasses adjusting our senses to vibration frequencies beyond our natural limit, for he would have told me of it. But I had learned to know two sides of Dr. Korsakoff. Although he took great pride in explaining his experiments to me, he secretly guarded his plans and formulae until he could offer concrete proof of their feasibility.

"I have tried to teach you much, Arnoldi," he said "but a complete knowledge of the science of infinite dimensions is too broad for one man. Our span of life is too short—the powers of apprehension too limited. Yet I mean just what I say about the planes of existence below and above our senses of vision and hearing. I will go even further. I believe there are living material things on these other planes. It will surprise you, no doubt, to learn that I have created a medium through which we may see and hear them!"

Ready for An Adventure

I STARED at him astounded—fascinated. He smiled down at me with supreme assurance, but without the arrogance that usually accompanies such statements of scientific power. Yet the conception of such a thing was too stupendous for me to grasp all at once. At the moment I could relieve my tension in no way but to laugh. My mirth seemed to sober him and his features clouded. I felt suddenly ill at ease under his steady eyes and became more serious.

"I'm sorry, sir," I said, grasping his sleeve: "I couldn't help but laugh at the conception. But I simply can't grasp the feasability of such a thing. It sounds too much like Valenev."

"Arnoldi," he replied impressively, "as we see it the world has been fairly well explored. Yet, if we were to delve into the hidden worlds around us, think of the strange objects and beings that might be seen. Why the value of the knowledge that

could be gleaned from such an adventure would be beyond calculation!"

My head spun at the thought and I stood erect, eager with anticipation.

"You almost convince me, sir," I said, "that such a thing can be done—that such worlds do actually exist."

"It *can* be done, Arnoldi," he replied, smiling again: "And other words *do* exist within our own world! It is possible that we can visit at least several of them. Would you like to see them, my son?"

Trembling I nodded assent. Dr. Korsakoff grasped my shaking hand and wrung it in a firm grip. He placed an arm around me and together we strode slowly toward the laboratory.

As we entered the work-shop which contained practically every known instrument of optical science, and many others, including high-speed lathes, grinding apparatus, measuring devices for facet shaping, and priceless stores of transparent gem-stones, I had a vague feeling that the experiment would see the advent of something unknown to man. I cast a glance at the scientist. His face was stern and serious, although his eyes glowed with excitement. But, could I have realized then what the experiment was to lead to!

He motioned me to be seated before a long, quartz-topped table. It shone like myriads of diamonds under the glare of a hanging lamp emitting a strange purplish light. In the center of the table lay two oddly-shaped helmets. From what I believed to be the front of them, there struck out two sets of tapering metallic cylinders. On the sides were accoutrements which I learned were to fit tightly over the ears. Wires ran from the helmets toward the edge of the table and disappeared beneath it. I surveyed them curiously as Dr. Korsakoff sat down beside me. He picked them up and held one close to me for observation.

Inside the cylinders I saw what appeared to be crystals with hundreds of facets which glittered weirdly under the light. The helmets were oddly designed and of light, pliable metal. The backs of them were not unlike the ancient Roman helmets in so far as they extended down to the shoulders where the metal would fit snugly.

The auditory appliance was shaped exactly like the human ear. In the center were small, bright-metal discs which fitted directly into the inner lobe for unhampered transmutation of whatever sounds might come through the magnetic discs from the invisible worlds!

"You see, Arnoldi," the doctor said in explanation, "there are several crystals in each of the sense-transmitting cylinders. Each one was ground with seventy-seven outer facets and double internally. I have cut three different stones and pieced them together in slices to give them the power to transmit the super-sense vibrations. Between each of the lenses, yet below the direct line of vision, are very tiny, high-frequency electrical bulbs. By special transformer I shall lift the voltage through the crystals from 110 volts to 22,000. The current will pass finally through the helmets and into the cylinders, creating a transformation of vibrations to our own perceptive limits. The senses of this world are directed to us by a ray, commonly known as the Infra-Red Ray. In a small transparent container behind each of the crystals is an accumulation of *dionium*, a creation of my own. Beyond that, my dear Arnoldi, I can tell you no more about these instruments; for I have constructed them in such a way that caused me to depart from many accepted principles of optics."

He lifted a helmet and fitted it over my head, the cylinders directly in front of my eyes and the auditory systems snug in my ears. I sat deathly still and closed my eyes while he made certain adjustments, expecting momentarily to find myself looking into a strange world of the beyond. But nothing met my vision. Only darkness—deep black-

"Do not be alarmed, Arnoldi," he patted me assuringly: "There is nothing to fear. Just sit still until I adjust my own helmet to the Sixth Dimension, and we will be ready for the experiment."

The Red Dimension

PRESENTLY I heard the hum of a high-speed motor somewhere under the table. It throbbed softly through the auditory apparatus on the helmets. I shuddered at the terrific vibratory movements of the world I began to perceive. Suspended between two worlds, these new sounds grated like steel on my ears. I remembered that such vibrations were alien to the human organs and settled back to wait.

I was startled by a sudden word from Dr. Korsakoff, for it pulled me back to our own world.

"I didn't mean to frighten you, Arnoldi," he said, chuckling: "There's really nothing to be alarmed about. I merely wanted to tell you not to jump when I start the current flowing through the helmet. It will sound very weird on your ear-drums. Sit perfectly still and keep your eyes closed for best results. Open them very slowly, and a new world will be revealed. Now be perfectly still, my son. I am switching on the current. You keep your hands on the table. I will control the vibration from a panel at my side. Have an enjoyable visit into the Sixth Dimension—the Red World, Arnoldi!"

I sat with closed eyes for a long time and felt drifting off. Then slowly I opened my eyes and was stunned by an amazing brilliancy of vari-hued lights. For a moment a pain shot through my eyes—they pained to the depths. Gradually it wore off. Crystals that ranged in color from deep, unfathomable red to emerald green danced before me. As though fighting for some control of a color-world the reds began to seep through into the blues and the greens. They suddenly merged into one solid color—the deep, unfathomable infra-Red of the spectrum. The suddenness of the change caused my whole system to react in a terrific shudder. Remembering the scientist's words, I clinched my

teeth for control over myself. Now I leaned forward tensely. Objects were slowly shaping themselves from the masses. It was the Red World! I thought I was gazing on a world of fire. Everything shimmered in what appeared to be a terrific heat. Then, as objects assumed definite form, I was able to detect the outlines of strange, luxurious vegetable growths. Weird trees and ferns stood on all sides. The sky overhead was of a red not less deep than the more concrete materials of the Red Dimension. The earth—as it appeared, showed in open areas like blood-colored sandstone. Across it raced what appeared to be heat waves dancing on a hot, searing surface. Slowly the scene moved.

Then I beheld a rather large clearing completely surrounded by the thick, tangled vegetation. I thought I caught a slight movement in a patch of swaying lush herbage. I watched the spot tensely.

Slowly, very slowly, the blades parted and out of them protruded a weird snout. The thing was coming into view, slinking forward like a stalking panther. Its nose, like the magnified beak of some grotesque earthly insect, pointed to needle thinness, and was pike-like at the base where it protruded from a terror-invoking face! The eyes were like the orbs of an owl, opening and closing with even, rhythmic precision. The creature seemed to crouch ready to spring upon a victim. I wondered at whom or what that death-dealing pike of a snout was aimed. And what did the victim look like? And what were the dimensions of the strange beast or insect of prey? I was soon to learn!

Suddenly the crouching thing hurled itself forward at terrific speed. As it raced on long, slender legs toward the center of the clearing, it appeared in full view to be really an insect. It had three pairs of well-balanced legs that held the segmented body well above the herbage when erect. Two pairs of wings were distinctly discernable; although they were as transparent as the wings of a dragon fly. They struck outward, apparently to lend speed to the racing thing as it fairly flew across the open. Accompanying its motion there was a dull whir that sounded weirdly in the heavy silence of the red jungle.

I felt as though I were in the jungle, and the thing was coming toward me. I tried to move, even to scream but it were as if I had turned to stone. A frenzy of fright filled me. But then I perceived another creature even more loathsome than the insect. I tried to close my eyes from it, but a horrible fascination of fright forced me to look at it. It stood, half-crouched, as though waiting for the arrival of a deadly enemy to give mortal combat. Its eyes, protruding from an egg-shaped brow, were concentrated on the coming insect. As though suddenly sensing that it was being watched by an unseen enemy, it turned its head in my direction for a glance at its invisible audience. The thing's eyes bored into mine for an instant and I suddenly felt very weak and limp.

Probably eight feet tall it stood. From its vile mouth blood-hued saliva dribbled. Loathing filled me. It had four skinny legs that seemed like stilts, jointed well up toward its narrow, straight hips. The abdomen bulged like the belly of some huge boiling pot, and heaved tremulously with each enormous intake or outlet of breath that must have been as foul as the creature itself. At the end of each leg was a wide, web-shaped foot that covered an enormous area even for so large a monster. Broad-shouldered, with three tentacle-like arms attached to each side, the terrifying creature of the Sixth Dimension stood ready to meet its antagonist. The arms writhed like so many snakes held together by the heads, their bodies swinging free. The arms on the right clutched at a long spear-like object that appeared to be shaped like a small fan at one end.

A Battle of Beasts

SIGHT of the object, which I accepted at once as being a kind of a weapon, gave me the feeling that this horrible beast was of greater intelligence than the other. Seeing the weapon brought into play strengthened my belief that here was really a creature far above the merely animal, despite its indescribable loathsomeness! That it was deadly, more deadly than any weapon we on this plane ever possessed, I was soon to learn!

In comparison with the intended victim who now stood with weapon upraised, fan-shaped end pointing toward it, the monstrous insect seemed slightly more than half his size. Yet the insect came on without hesitation, its needle-tipped, natural weapon, aimed at the towering creature. Should the insect actually succeed in reaching the more intelligent creature of the Red World, its pike would doubtlessly run him through from pot-bellied abdomen to the small of the back.

With a sudden roar that echoed and re-echoed in my ears, the larger creature crouched down. Then I heard a whining hiss and from the fan-like end of his spear-shaped weapon shot a sudden beam of strangely mixed reds and yellows. The ray seemed to begin in a point and widen abruptly as it left the weapon, taking in an area that I had no way of calculating. At any rate, the racing insect seemed to stop in its tracks and wilt to earth where it lay, trembling violently. Finally it became still.

Then, all at once, the air was filled with a terrible hooting and screeching that chilled my blood. The victor of the uneven battle stiffened at the first outbreak of the violent sounds and swung his protruding eyes around the clearing. His legs went rigid as though prepared to run, when he beheld a slowly-advancing army of the monstrous insects ringed around the edge of the clearing and treading the low lush herbage with slow deliberate steps as they crept upon him. As they came on, marching with ominous steadiness, I wondered if any of the upright creature's fellows were near. Surely he had not wandered into this remote section of his world alone. Immovable as I was I could not look about, and I dared not move for fear that they could see me. But the creature himself seemed prepared for

the onslaught. He assumed his crouching position again and pivoted around in a circle. Suddenly the insects rushed. The whir of their movement and the new intermittent hooting, created a battle din in my ears. Instantly the peculiar rays shot from his weapon and the ground on one side of him was covered with the stricken insects, twitching spasmodically as they died. He spun around in a quarter circle and cut a clean slice from the ranks of the threatening insects.

As he spun around again, I speculated upon the strange scene. What was this? Was it the re-enactment of a scene such as had gone past in the dim days of our own world? Were these enormous insects the undeveloped life from which had sprung the intelligence of the Sixth Dimension—the Red World? In all probability it must have been! For after all there was a strange similarity between the two forces. The legs and the bodies! This then, must have been a dreadful battle between the developed and the undeveloped—like the eternal combat of man against beast—beast against man, for supremacy. Would intelligence on this weird plane of life, as on our own, ultimately predominate?

With panic striking at my reason I watched the battle. The Red World's "man" swung around again with whip-like motion. His rays cleared a clean path through the threatening ranks again. Only one quarter of the circle remained now and the upright creature opened his vile mouth to voice his cry of victory. It came in a weird maniacal scream that vibrated and re-echoed over the Red Domain like the cry of a preying jungle beast! The insect horde hooted dismal sounds of defeat, but what remained of them came on nevertheless. Then again came the defiant answering cry of the upright creature. He tested the atmosphere with wide, flexible nostrils. Again he voiced his cry of victory. It was answered by a series of exultant roars coming from somewhere deep in the jungles.

Then the creature made his fatal mistake. Expanded to conceit by the victory within his grasp, he lowered his ray weapon and surveyed the remaining insects with contempt. Whether the presence of his fellows, probably not far in the growth, had bred within him a feeling of security, I do not know. But hardly had he lowered his instrument of destruction than the horde of insects closed in on him with astonishing rapidity. Bewildered at the suddenness and calmness of the rush, the creature roared in a different note, appealing and terror-stricken, and struggled vainly to bring his weapon into play. It was useless at such close quarters and he cast it aside to grasp six hooting insects in the steel-like grasp of his writhing arms. He crushed them on the instant and hurled them aside. I heard him gasp, when the needle-pointed pikes of the insects began to puncture him. I caught sight of ghastly mysterious organs protruding from his bulging belly as an insect shook itself loose. He crashed to the ground. Instantly the insects changed the sound of their voices and the ring of high-pitched hootings drowned his cries of death.

The Deadly Ray

AT ONCE they set upon the fallen creature. They gouged and tore into his vitals. He managed to keep up a dismal howl even after his vitals had been ripped from his belly. I saw a dozen insects line themselves along his side. They plunged the pike-like snouts into him and sucked at the thick red substance that was his blood. One lowly creature took hold of the thick skin near the victim's breast. With a jerk it ripped a long streamer of flesh from the body and gobbled it with smacking relish!

That scene was altogether too much for me to stand. I strained and strained to tear myself away from the stone-like immovability that gripped me. Finally I managed to emit a terrible scream and seemed to faint away.

* * *

When I opened my eyes once again, I was still in the Red World. Out of the jungle raced a wedge-formation of upright creatures, like the slain, with ray instruments pointed at the devouring insects. With incredible speed they came into the clearing. Instantly the space was aglow with the red and yellow beams. The insects clambering over the torn and mangled body of the fallen creature lined themselves to meet this new enemy. With an abrupt rush, as though by some signal they advanced toward the oncoming wedge. But before they could cover any amount of space the fatal rays wilted them in their tracks. Harsh roars echoed through the growths. The features of the upright creatures were even more hideous with rage and they set upon the dying insects to gorge! One insect just to my right seemed to have been untouched. It rose suddenly and attempted to escape. An upright creature detached himself from the gorging mass and gave chase, bringing into play as he ran, his death-dealing ray instrument.

On they came, directly toward me. As they neared I could almost feel the terrific heat of the creatures' bodies. Ghastly features stood in front of my eyes. It seemed to me that hardly a foot of space separated us! I screamed insanely again. Then I saw the upright being lift his ray-gun. The reddish yellow ray seemed to bite into the depths of my eyes. I heard as from far away a deep-throated groan. I seemed to be flying through space and suddenly, with a jerk, I found myself seated in the chair of the laboratory. I tore frenziedly at the helmet on my head and managed to take it off. Then a dizziness overcame me and a black void . . . .

At any rate, I lay stunned and senseless for what seemed hours. When I finally regained consciousness I opened my eyes to see Dr. Korsakoff sitting stiff in his chair, his helmet still intact. I reached out and grasped his shoulder and shook him. He was cold, his body rigid. Terrified, I leaped from my chair and swung him around. Oh, God, that I may never witness such a sight again!

The front portion of his helmet seemed to have been cloven with an axe! The vision cylinders hung in shreds and clotted with dried, cracking

(*Concluded on page 744*)

The Vapor Intelligence

By Jack Barnette

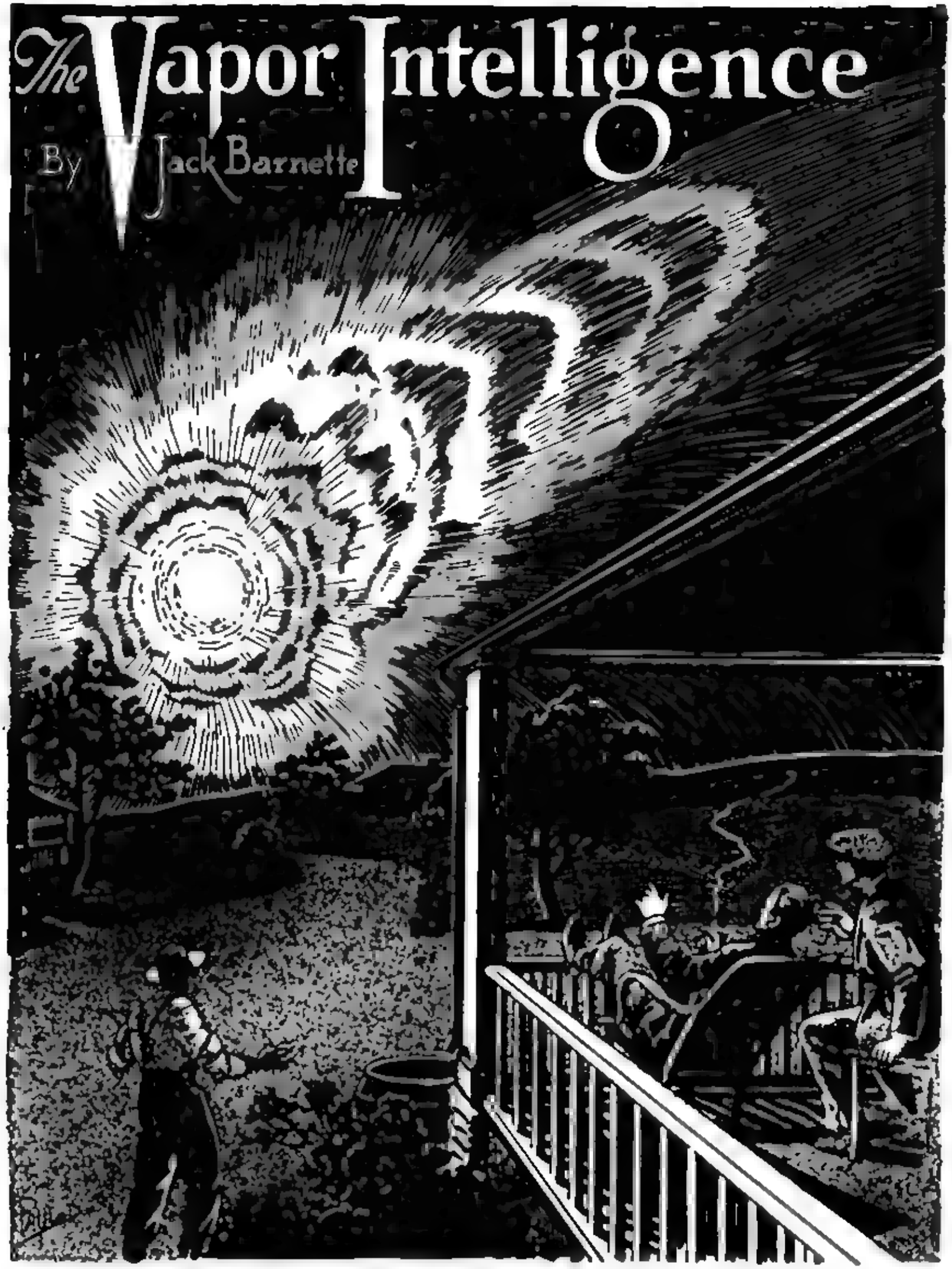


Illustration By Paul

They jumped to their feet as a huge burning ball flashed across the firmament, leaving its trail plainly marked by the glowing train heated to incandescence from the friction of its passage.

THE VAPOR INTELLIGENCE

JACK BARNETTE

MODERN science believes that the chances are one in a million that intelligent beings on any other planet should be constituted the same as we. It is almost certain at any rate that, if such an intelligent being from another world should visit us, the result would be far more grotesque than even our most audacious science fiction authors can imagine. What such an intelligence will look like, it is impossible to even conjecture. It may be invisible, for all we know, or it may have a physical constitution that to us appears absurd. The present author has given us in this interesting story one such possibility, written in a most striking manner you will not forget it so soon. Incidentally, the great mystery of it all keeps you spellbound until the end.

I DO not wish to be considered responsible for the veracity of any of the statements or theories contained in the following pages. I have only tried to give a chronological account of the series of events which still form one of the main topics of discussion in the little town where I spent one night this past summer. Any one with an investigative turn of mind who desires additional information about that Thing to which Ruberg usually refers to as "the Ghos' ", would find it well worth their while to go to Ruberg. They should talk with Mayor Fisher, with Doctor Clancy, with old Ruberg himself, and with Joe Bones. If a suitable consideration is mentioned, Joe may be induced to act as guide to the bare spots about Loon Marsh; always providing he is assured that the round trip will be made before the sun sinks behind the mountain that lies to the west of Loon Marsh.

Why Ruberg was originally settled is a mystery. For hundreds of years it had nestled between two mountains, its inhabitants living their quiet uneventful lives in a monotonous peacefulness until a young man named Ford developed a "gasoline buggy". His and other makes of small automobiles brought the necessity for building good roads; and the state built a paved highway straight through the heart of Ruberg, permanently destroying the peacefulness of the little rural hamlet. The road brought me to Ruberg in the course of my wanderings and I stopped because I was hungry and tired, and Ruberg was as good a place to spend the night as I was likely to find by driving farther.

It was in the evening after dinner and I was seated on the verandah smoking my pipe and gazing into the dark valley. At my right was seated old Ruberg himself, a short, fat jolly descendant of that proud race of Swiss innkeepers. We had been talking of nothing of any importance—when suddenly a light flashed across the sky and disappeared in the hills that lay beyond the valley before us!

"A whopping meteor!" I exclaimed trying to break the monotony of the evening by a new field of conversation.

The old man was silent as he gazed into the night.

"Do you see many of them here?" I ventured further. His silence after his voluble commercial chatter interested me.

"Um-um," he half whispered: "Sometimes."

"The thing seems to have affected you," I said smiling.

"Yes," he nodded his head, "The Thing! You have heard of it then?"

I professed my ignorance: "I referred to that meteor just now."

He shrugged his shoulders strangely and then relapsed into silence. Finally, as I rose to retire, irritated by his strange demeanor, he laid a hand on my knee.

"Wait," he said: "I'll tell you about it."

I sat down and listened to him as in his rambling way he told me of the strange event that had broken into the life of this peaceful retreat. He spoke like a man who tried to reconcile continually his senses with something unheard of. His story, as I remember it, is as follows:

It was an evening like this one, years ago, and some of the villagers were seated on the verandah. Little had been said by any of them for almost half an hour until Dick James, watching a meteor blaze a shining path across the evening sky, remarked casually: "Another soul gone to glory."

"Huh?" grunted Walter Adams. He was a college student on vacation.

"Somebody's soul gone to glory—didn't you see that shootin' star?"

"Applesauce! Such superstitious rot! You know darn well that meteors are fragments of disintegrated planets."

"Nope. Never went to college to study about stars and peek at them through spyglasses. Don't know a blame thing about 'meteors'. Old colored folks down on our place used to say that when you saw a shootin' star it was a sign that somebody had died. I never— Good Glory! look at that one!"

Everyone jumped to their feet, as a huge burning ball flashed across the firmament, leaving its trail plainly marked by the glowing train heated to incandescence from the friction of its passage, and plunged out of sight behind a neighboring hill.

"That one hit the earth and it hit near here!" exclaimed Walter: "Let's go over to look for it tomorrow!"

"Suits me," grunted James, who was not greatly interested in meteorites.

Strange Happenings

NEXT day Ruberg was agog with talk about the "shootin' star." It seemed that fully half the people had seen it, and the other half were rapidly coming to believe that they had. Many dire predictions were made concerning it. Flooda, pestilence, earthquakes and war were promised. Old Miss Hodgers suddenly remembered that she had witnessed one "jest perzactly like it" just before the United States entered the World War. It developed that similar astral visitors had heralded the beginning of the Great War, the Johnstown Flood, the Spanish-American War, and the "Flu" epidemic. In fact every event of major or minor importance which any of the older inhabitants could remember was promptly connected with a "shootin' star" seen just previous to the actual event.

Reports of the meteorite filtered into Ruberg all day, from surrounding farms; until the area in which it could have hit was narrowed down to the section around Loon Marsh.

Loon Marsh is a dismal piece of swamp land that lies between two hills about five miles to the north of Ruberg. Seemingly fed by underground springs, it has neither inlet nor outlet; but, even during periods of great drought, the Marsh never loses its water appreciably. The Marsh is about three miles long and about a mile wide at its widest point; it contains several open stretches of fairly deep water, where one may find reasonably good fishing. Cattails and marsh grass, water-lilies and bullfrogs, sun perch and catfish abound, also an occasional muskrat, wild duck and loon. Of course there are snakes galore.

At the southern end of the Marsh is a cluster of dilapidated cabins which bear the very descriptive appellation of "Shantytown!"

At the time the events recorded here took place, Shantytown was inhabited by half a dozen very ignorant and shiftless Negro families whose absolute worthlessness made them unpopular with the citizens of Ruberg, including the few members of their own race who lived there.

To Shantytown went Walter and James, only to curse the denseness of its inhabitants who were either too ignorant or too suspicious of strangers to give them any information. Once or twice they caught the odor of fermenting grain; and suspected that the lack of information obtainable from these members of a usually talkative race was to the fact that Shantytown suspected them of being prohibition agents.

Their popularity with the inhabitants of Shantytown was not enhanced when they began roaming through the wooded hills around the marsh, looking for a possible burnt spot where the flaming visitor from space had ignited the underbrush. They had searched only a couple of days when a number of odd facts came to their attention.

The first of these was that there were no longer any insects in the vicinity of Loon Marsh; though it had long been considered a pest-hole of mosquitoes. Then they learned that the frogs, which were plentiful in the Marsh, no longer croaked at night. This latter was noticed by several of Ruberg's thirsty citizens who had, under cover of darkness, slipped out to Shantytown in search of illicit liquid refreshments. The third day after the falling of the meteorite, Walter and James were astonished at the number of bleached white skeletons of birds, rabbits, squirrels and other little wood-dwellers that they found everywhere along the hillside. On the fourth night, the entire dog population of Shantytown transferred itself to Ruberg. But it is the fifth and sixth nights that have long been remembered by Ruberg.

Ruberg proper had gone to bed. Walter, James and several other "nighthawks," feeling it too warm to sleep, were loafing on the verandah of the Ruberg House, smoking, talking and listening to the radio, when pandemonium broke loose outside.

The entire population of Shantytown appeared to have moved *en masse* to Ruberg. Most of them were only partly clad; while several of the younger ones seemed to have dispensed entirely with clothing. Soon they had awakened all Ruberg.

The good citizens, trying with little apparent success to quiet the hysterical frenzy of the Shantytowners, could only elicit the information that they had been scared out of their homes by a "ghos'".

Finally the Shantytowners began to regain control of their emotions and their leader, Joe Bones—if he ever had any other name it had long since been forgotten—was calmed down to the point where he could talk almost coherently. From him they learned that queer things had been happening in and around Loon Marsh. The Shantytown negroes had first sensed something wrong when the frogs, birds and insects became silent. Then two of their group, poling their flat-bottomed boat into the marsh so that they might fish for "cats" in the open spaces near the center, found an increasing number of dead fish, and dozens of skeletons of frogs, birds, snakes and other small creatures. No sound broke the ominous quiet of the marsh, but the rustling of the marsh grass and the noise caused by the progress of the boat. The portentous silence, pregnant with evil, that had suddenly come over Loon Marsh worked upon the easily aroused superstitions of the Shantytowners and they soon discovered a mutual lack of interest in "cats" and an overwhelming desire to be out of the marsh.

Panic In Shantytown

THAT night the dogs had howled mournfully from dusk until dawn, effectually keeping their masters awake and nervous. The next night the howling started again as soon as it began to grow dark. Long before midnight the howling died to whimpers of fear and the dogs sneaked away over the hills. By the following night the whole population of Shantytown had become fervently religious. One of the older men who had once been a local preacher of sorts exhorted them loud and long, threatening them with hell-fire and brimstone and various other horrible punishments if they did not

mend their low and sinful ways—seemingly overlooking the fact that he was himself one of the community's worst offenders.

When the service was over they had rather reluctantly dispersed to their cabins and were preparing for bed when a loud shriek brought them tumbling out into the open. The self-appointed minister had lingered quite a while before leaving the cabin where they had held the meeting, and it was he who gave the alarm. High over Loon Marsh hung a softly glowing mist that constantly moved and changed its form. Slowly, as though borne by a light breeze, this luminous cloud was moving toward Shantytown. The Shantytowners took one look and suddenly developed a desire to be in Ruberg. Since none of them seemed to have imitated Lot's wife by looking back, they could tell no more about the strange phenomenon.

A count of noses developed that all Shantytown had arrived safely but two, Uncle Mose Smith and his wife Aunt Chloe. These two—the patriarchs of Shantytown—were very old; just how old no one, not even themselves, knew. Evidently they had not been able to stand the pace set by their terror-stricken fellows and had fallen behind; though one waggish citizen remarked that they might have been "goin' so fast that they run clear past the town."

Ruberg as a whole was rather amused at the Shantytowners, since it believed them the victims of their own too vivid imaginations. A half dozen of the young bloods of the town piled into a couple of flivvers and started out to meet Uncle Mose and Aunt Chloe. It was only a short while after their departure that the sound of two of Mr. Ford's brain children, traveling at a high rate of speed, reached the ears of the crowd gathered on Ruberg's main street; and it was followed almost immediately by the two flivvers that had started for Shantytown.

No longer did they think the wild tale told by the still scared group of negroes a figment of the imagination. They had reached the top of the hill overlooking Shantytown and Loon Marsh and, beneath them, they had seen the writhing phosphorescent mist, gathered, as near as they could tell in the absence of light, directly over Shantytown. This luminous cloud was connected by a thin bright streamer to a large shining globe in the center of the marsh. They had promptly returned to Ruberg without further investigation. They had not seen the two old colored people—in fact they had entirely forgot Uncle Mose and Aunt Chloe until they were reminded that they had started out to search for them.

Ruberg anxiously awaited the coming of the dawn and, when the sun's rays slipped over the mountains, a dozen carloads of curious citizens bounced along the rough road that led to Loon Marsh. On top of the hill overlooking the marsh the motor cavalcade came to a halt. The usual morning fog hid the marsh and the cluster of cabins at its end. When the sun's rays reached down into the little valley the fog eddied and swirled as it slowly rose from the surface. Soon Loon Marsh lay quiet and sparkling in the morning light. Then the cars slowly rolled down the uneven road that led through ill-tended "patches" where corn, potatoes and other vegetables were fighting a losing battle with the weeds.

A hundred yards from the cluster of cabins the leading car jerked suddenly to a stop and its occupants jumped out. The passengers from the other cars rushed forward to see what was the matter.

In the middle of the road lay two skeletons around whose bones hung parts of garments that were identified as having covered the aged forms of Uncle Mose and Aunt Chloe.

The people of Ruberg became suddenly awake to the deadly menace of this thing that was in Loon Marsh. A few hardy souls, including Walter and James, ventured on to the cluster of cabins; where they found the bleached skeletons of two mules, a cow and a number of chickens.

Ruberg did little that day but discuss this unheard-of thing that had happened right at their doorstep. An appeal for help was 'phoned to the state capitol by the sheriff; but when he began giving the details to the busy official at the other end of the line, that individual interrupted him, delivered a short but caustic lecture on "damned fools who have nothing to do but worry busy people with fairy tales," and hung up.

It was Walter who first suggested that the meteorite might have something to do with the mystery; and this theory swiftly gained adherents.

Evening found a dozen cars, now filled with armed men, on the hill overlooking the marsh and a half-dozen pairs of field glasses continuously swept its broad expanse.

The Ghost of Loon Marsh

JUST as it grew dusk one of the watchers sighted a bright sphere, which appeared to be about thirty feet in diameter, just as it emerged from the depths of the marsh and floated lightly upon the surface of the water in one of the open spaces. To those with glasses it looked like a huge ball of highly polished metal. As it grew darker, the ball glowed with a ghostly phosphorescent light and from somewhere about it a thin shaft of luminous vapor emerged. Swiftly this mist thickened and spread, dividing into thin streamers that writhed about over the surface of the marsh; but which always remained connected to the phosphorescent globe by the thin rope of vapor that continually emerged from it. Occasionally, a bright gleam would appear in some part of the mist and a gleaming thread would pour back toward the glowing sphere. Sometimes these flashes were quite brief but occasionally one would last for several minutes. It was all so studied that it gave the watchers the eerie feeling that it was connected with some intelligent being. One portion of the mist seemed to be bearing toward Shantytown at a great speed. By this time it was quite dark and the marsh itself was no longer visible; but the tenuous streamers glowed

brighter and brighter. The streamer of mist reached Shantytown, hesitated there a few minutes as it wavered back and forth, and then passed on seemingly feeling its way along the hillside.

Almost directly across the marsh where the men from Ruberg were gathered, the streamer pushed its way up toward the top of the hill, where a field cut into the woods. Suddenly the tip of the streamer glowed brightly and a pulsing silvery stream poured back through the streamer to the shimmering ball. Larger and larger grew this silvery stream, and then the others streamers flowed back on themselves and thence out along the glittering stream toward the gleaming tip. As the other streamers united with it, the one on the hillside expanded to a brightly-glowing cloud.

Then one of the watchers exclaimed: "My God! the damn thing is feeding. It is in Brown's wood pasture and he's had five fine steers in there for a week. There'll be five skeletons there tomorrow morning. Brown's house is only about half a mile across that hill and I hope to God that it finds enough to eat without crossing the hilltop."

The whiplike report of a rifle echoed through the valley as one of the men took a shot at the globe in the marsh. The globe jumped violently and the gleaming streamer connecting the globe to the luminous cloud was broken.

The gleaming cloud and the streamer—both gone suddenly dull—drew together and merged into a shapeless mass that hung motionless halfway between the hilltop and the marsh. From the sphere a tiny glowing shaft rose straight into the air for a short distance. This shaft branched into five thin tentacles that waved back and forth as they grew longer and longer. The group on the hillside watched silently while the tentacles extended themselves until, in their waving search, they had covered the entire surface of the marsh. Then they slowly moved up the hillsides, keeping the same distance above the ground as though through an understanding. Several times the men from Ruberg made ready to flee as one of the waving tentacles approached them. Finally, one of the arms touched the mass of glowing mist and a portion of the mist flowed swiftly back along it to the glowing ball. The other tentacles then drew back into the sphere, and the glowing cloud moved back up the hill until it reached its former position, where it again gleamed brightly; and once again the pulsing silvery stream flowed back along the misty path that led to the luminous sphere.

The group of men held a brief council. Five of them, hunters all and crack shots owning high-powered rifles piled into a flivver and drove back a little ways toward Ruberg. Then they turned aside into an old road that ran along the top of the hill parallel to the marsh.

As the flivver rocked and bounced along the rough road they could catch an occasional glimpse of the glowing mist high on the hillside across the marsh.

The flivver stopped opposite the portion of the marsh that contained the refulgent sphere and the five made their way through the darkness and underbrush to a spot where they could see the glowing ball. One of the five, who had been an army sergeant, automatically took command. Finding a place that was to their liking, they knelt and the ex-sergeant spoke softly:

"Ready!" The men stiffened in their places.

"Aim!" Guns were trained carefully.

"Fire!"

The roar of the five rifles drowned out the command. Under the impact of the steel-jacketed bullets, the sphere bounced fifteen or twenty yards along the surface of the marsh, and the shining thread that connected it with the cloudlike luminosity against the hill was again severed.

Gone!

A LOW distant drone came to their ears and the ex-sergeant glanced at the glowing figures on the dial of his wrist watch. Three o'clock! The hum of the high-flying night mailplane died away in the distance. Three o'clock—soon it would be dawn. They had not realized that time was passing so swiftly.

Again the thin gleaming column rose steadily for a short distance into the air above the sphere and branched out into the five waving tentacles which began their fantastic searching of the air above the marsh.

When the tentacles had extended themselves almost over the whole marsh, the rifles roared out again, and the phosphorescent globe was again sent bouncing along the surface of the marsh. The gleaming column with its waving tentacles was separated from the sphere and drew itself into a small gleaming ball that hung stationary over the spot where the sphere had been.

This time the sphere remained quiescent for many minutes as though it were considering the unusual turn its affairs had taken.

Suddenly lambent flames of cold white light flickered over the sphere's surface and the globe seemed to begin to revolve. Faster and faster it whirled, and brighter and brighter grew the tiny white flames. Then, from the top of the whirling sphere, there emerged a thick, coruscating pillar of malignant, angry-looking red vapor at whose top was a brilliant purple cube. From the purple cube four spinning arms of the same angry-colored vapor and tipped with a shining purple disk, shot down the marsh toward Shantytown. Then a similar arm flashed in the opposite direction. Slowly these arms began to move as though to revolve about the central column. Once again the rifles barked and the impact of the bullets hurled the sphere sideways. The coruscating pillar of red vapor snapped, and gathered itself and its arms into a sinister, spinning ball of Satanic light in whose center the purple cube gleamed balefully. The two purple discs revolved swiftly about the red globe's equator.

The riflemen were suddenly aware that objects around them were becoming visible and that day was breaking.

Furiously the tongues of flame leaped and flashed about the sphere which lost its phosphorescent glow and acquired a cold, polished, mirror-like gleam in the pale morning light. Once the sphere dropped down to the surface of the water; but it instantly popped back.

Swiftly it grew lighter and in the east the red sky heralded the coming of the sun. Strangely enough there was almost no fog over the marsh and the few patches that were visible seemed to be almost consciously avoiding the vicinity of the sphere, the still spinning red globe, and the two clouds of mist, which had now lost their luminosity and appeared a silvery blue in the morning light.

When the first rays of the sun shot over the mountain behind the riflemen and touched the silvery cloud on the opposite hillside, the shining mass writhed, twisted and contracted. It grew darker as though its silver was being tarnished and then portions of it turned a sickly yellow and dropped to the ground in great gobs of putridity. A slight breeze carried to the nostrils of the men on the hillside the odor of badly-decayed flesh. Soon the last of the silvery mist dropped to the ground, leaving a tiny patch of deep blue gas which shot upward at incredible speed to blend into the blue of the sky, while the sun's rays crawled deeper and deeper into the valley. The red globe and the smaller silver cloud were the next to go—the red globe decaying even faster than the silvery mist. The purple cube and the disks shot skyward with the same amazing speed as had the bit of blue gas.

The sun's rays seemed to have no appreciable effect on the polished globe except to cause it to stop spinning; but those who spent the morning watching it, saw it roll over just before noon and an opening appear in its side. Out of this opening there poured a viscous red mass that spread out over the surface of the marsh. Then the sphere rose a little above the surface and the red mass poured faster. Finally the red substance ceased to flow and the sphere rose into the air at an ever-increasing rate of speed until it was lost to view.

Early evening found the marsh deserted except for a host of buzzards, attracted by the sickening odor, who flew around but did not alight. The viscous red substance had rapidly decayed, its horrible stench augmenting that caused by the decay of the luminous vapor. A party that went out to the marsh about midnight soon returned with the information that nothing was to be seen.

Ruberg spent the next day surmising where the shining globe had come from and what it was. The theory propounded by Walter and backed up by Dr. Clancy, Ruberg's beloved old physician, whose hobby was astronomy, was the most popular; both because of its novelty and because its adherents could at least give some more or less scientific grounds for their argument. Walter summed it up fairly well on the Ruberg House verandah while talking to the sheriff.

"It's like this," he replied in answer to one of the sheriff's questions:

"Nothing like it has ever occurred before in the history of our present civilization, and than has explored practically the entire surface of the globe without having discovered anything even remotely resembling the thing we saw on Loon Marsh. For these reasons I do not think that it is a product of this planet.

The Vapor Intelligence

"THIS belief is bolstered up by the fact that I saw the flaming body that plunged from the sky into the hills around the marsh. This occurred just before the singular events around Loon Marsh began taking place. If we assume that it was the sphere that was seen plunging to earth, we must suppose that it must have become fearfully hot from its journey through our atmosphere. Indeed this was indicated by the incandescent trail that it left in the air. Yet it seemingly avoided the sun's rays and its contents were destroyed when exposed to them. This would seem to indicate that it was not the heat rays of the sun that it tried to avoid, but some of the other rays. This would probably eliminate Venus or Mercury as its possible source; for these planets, being closer to the sun, receive the sun's rays with a greater intensity than does the earth—though it is possible that the vapor-laden atmosphere of Venus might afford the necessary protection. It is improbable that anything from the cold, almost airless planet of Mars could have survived the heat generated by the friction of the sphere's passage through the earth's atmosphere. Thus, if we confine ourselves to our own solar system, the possible planetary home of our unearthly visitor is narrowed down to Jupiter, Saturn, Uranus, and Neptune. Our knowledge of these planets is exceedingly limited. Jupiter and Saturn are supposed to be still in a gaseous state or, at least, to have a very heavy vapor-laden atmosphere that prevents the observation of the solid portions of these planets, should any exist. All of these planets are far from the sun and are unfit for animal lif. such as we know; but they might have produced some such sentient being as that which we witnessed.

"That it had some measure of intelligence we must grant, especially since it was capable of constructing a conveyance that enabled it to travel through space, and equipped this vehicle with a polished, mirror-like shell that probably repelled the sun's rays that it encountered while in space. The substance of which the sphere was composed was probably very light, even on the planet where it originated, and was evidently lighter than our air, which would account for its vertical flight as soon as it lost its contents. It must have had a melting point far above that of anything we know.

"Without being able to give any better scientific reasons than the above, I will say that it is my opinion that the sphere came from Jupiter and that it contained a gaseous substance unknown to us, possibly a bit of that unknown matter which forms the famous red spot on that planet. You know

(*Continued on Page* 745)

The Conquerors

by David H. Keller M.D.

Illustration by Paul

The picture focused directly on a woman. Her eyes were open and she was breathing through her mouth. If this were not Barbara Ward, the unfortunate slave, it was a woman very much like her. Sir Harry pressed the blue button—and a voice issued from the woman.

THE CONQUERORS

By the Author of "The Human Termites," "The Boneless Horror," etc.

What Has Gone Before:

RADIO service all over America is stopped and is then suddenly resumed. A message comes over the air, from people who call themselves the "Conquerors," stating that all air traffic over five southern states must cease. They are not taken seriously, but aviators attempting to fly over the states are forced down. Finally, after another interruption of radio service, the "Conquerors" send another radio message, stating that all aviators who attempt to fly over the states will be killed.

The nation is upset and a reward of a million dollars offered for apprehension of the instigators of the outrages. Meanwhile a huge-headed dwarf, who calls himself an "Ambassador" of the "Conquerors", calls on the President of the United States and demands that these southern states be vacated. He cites the fact that their power has been demonstrated by crippling all the electric service in that territory. He gives the President several weeks to order the evacuation. He states that he represents a race of men who are fifty thousand years in advance of our people intellectually.

On his second visit he is killed; and it is discovered that his bodily constitution differs from ours.

With no evacuation of the states ordered, a heavy fog descends on them and after a year all the people have been driven from them.

Sir Harry Brunton, a representative of the British government, is sent to Washington to investigate the strange happenings. He hires two young Americans, John Ormond, a sportsman born in Tennessee, and Mallory Wright, a scientist, for a secret mission.

THE two friends left the consulate in a most jubilant mood. Once out on the sidewalk, their happiness rapidly diminished.

"What do you suppose he meant, Mallory, talking about elephants out at old Reelfoot?" asked Ormond.

"I don't know and I don't care. What I am anxious about is this: he has asked us to have dinner with him at his hotel, and what are we supposed to wear?"

"Why, the very best we have."

"But is that good enough?"

"Certainly it is. That old boy is a real sport. Didn't you hear him say that he wanted people to call him plain Brunton?"

"Yes, he said that, but perhaps only to make us feel good. I am going to beat it for the library and see who he really is. I suppose you are going back to dress?"

"Not on your life! I am going to spend a little while polishing that elephant gun. 'Jumping juniper berries! That would be a hot one, to actually shoot an elephant out at Reelfoot!"

At seven-thirty, Mallory Wright called for his friend. In spite of all his talk about polishing the gun, Ormond was clean-shaven and faultlessly dressed in a well-cut tuxedo.

"I have found out about our new boss," exclaimed Wright. "You had better not call him Brunton. He is one of the most noted anthropologists in the world. He has written extensively for the *Journal of the Royal Asiatic Institute, The Indian Antiquary,* the *American Anthropologist* and perhaps fifty other papers. His work in Asia was so remarkable that they made him a knight, and so he has a 'Sir' in front of his name. The article I read stated that he is wealthy enough to finance all of his own explorations. I'll say he is a real man. This is going to give me a chance to learn something about anthropology."

DAVID H. KELLER, M.D.

"Listen to me, Mallory," said Ormond, grabbing his friend by the shoulder: "Will you stop long enough to answer one question? What is that man? And what does that word 'Anthropo—' something mean?"

"Do you mean to say you don't know? It is the study of man and his culture at various stages of his development."

"You mean a study of dead men?"

"To some extent."

"Then what does he want me for? And what was all this talk about hunting elephants?"

"You're absolutely impossible, John. Come on and let's beat it for the hotel."

I

Rather to their surprise, when they inquired at the desk for Sir Harry Brunton, and were ushered up to his rooms, they found him dressed in some old sport clothes and smoking an even older pipe. He waa rather amused to see their dress.

"I thought we would dine up here," he explained: "My word! but you gentlemen have put on a lot of side. Now that you have shown me that you have such good clothes, suppose you take off your jackets and make yourselves comfortable. I wanted to talk to you, about our trip, in private."

It was not till after the meal had been cleared away and the door locked that the Englishman started his explanation:

"I ought to tell you, gentlemen, that I am here as a personal representative of our Foreign Office. Over in London we have been rather disturbed at the way things were going here in the States; at times it seemed to be a world problem rather than merely a local one. No doubt you know what I am talking about: the trouble with the radio and those odd messages and the bally mist and everything.

IN this installment, Dr. Keller's marvelous story comes to a conclusion, and we get a thrilling insight into the race of super-men—"The Conquerors."

Dr. Keller develops, in this installment, a great many profound truths, and one of those truths is that a nation's power rests, not so much on its intelligence, as on its ability to make use of that intelligence. In other words, on its inner psychic power.

America is the marvel of the modern world; not because Americans are more intelligent than other races, but because we are a nation of quick-thinking, aggressive, restless, and ambitious people. In other words, we are a young race possessing all the instincts of youth. If a nation loses those instincts—the inner urge to create and to surmount all obstacles—no matter how great its intelligence may be, that nation is doomed to senility. Nowhere have we seen this theme brought out so powerfully as in the chapters you will now read.

This story started in our December issue. Back numbers may be had at twenty-five cents each.

When I was in Asia hunting bones a few years ago, I ran into a Valley of Mist. I wanted to look into it, but the natives became panicky and, the first thing I knew, they had me tied to a pony, and they never let me go till we were some hundred miles away. I never could learn just what they were afraid of. But that mist, as I saw it down in the valley, was rather like the description of the mist that caused so much trouble for your people.

"That might have been a mere coincidence. But I have found that there is very little in life that happens by chance; almost everything has a reason back of it. Therefore I felt that the same reason was back of both of these natural phenomena. My government has asked me to come over and investigate, and I have been doing a little since landing.

"Perhaps you have heard of the man who was shot in the President's office? No? Well, it makes no difference, but he was an odd little thing; and I was able to obtain some very interesting information in Washington. What I want to do is to go to Tennessee and see if I cannot find some more men like him.

"Perhaps you know that there used to be a lot of activity in the mountains of the Appalachian Range? I mean earthquakes and volcanoes and the like. Not lately, but millions of years ago. Still having little earthquakes, but mostly the range is considered a dead one. Then, after a long period of inactivity there was a sudden earthquake in Tennessee in 1811. A lot of the land just dropped and formed Reelfoot Lake, eighteen miles long and three miles wide, and no one knows how deep in places. Everything dropped, prairies, swamps and forests. Is that correct, Mr. Ormond?"

"That is what my father's grandfather said. He was just a boy when it happened, and they came to the Reelfoot country not long after."

"Did he have any idea of what caused the trouble?"

"No, not anything more than the rest. As far as we local folks knew, it was just an earthquake."

"There has been another explanation lately," added Mallory Wright: "I took the time to look it up in the library this afternoon. All that region is undermined and honeycombed with enormous caves. There may have been an earthquake, but what happened was this: the roof of some of those caves got too thin and dropped, and the hole just filled up with seepage from the Mississippi River."

The Start

"THAT is good, Mr. Wright. And that is what happened, though even that does not tell all that I want to know. Anyway, I want to go to that lake, and for just one reason. I think that somewhere near there we will find traces of other men like this poor fellow that was killed, of the men who are in back of this messy business."

"You mean 'The Conquerors?'" exclaimed Wright.

"That is what I mean."

"Do you know the danger?"

"What danger?"

"Didn't you hear the last message: 'Now that you are out, stay out?' I understand that all who have gone in since then have been killed."

"Hardly. What we know is this: that those who have gone in have not come out again. They have not been heard from. That does not mean they are dead, does it?"

"Why——no——not exactly. They might be—"

"My word! You worked it out for yourself. They might be detained there as prisoners. Anyway, the three of us are going in. Just the three of us. We are going to sneak in through the back door. I have studied the map rather carefully and my plan is this: we will go to Missouri, change into some old clothes, buy a rowboat and cross the river so that we will land near a little old town called Tiptonville. As far as I can make it out on the map, that is between the river and the lake. Do you know the town, Mr. Ormond?"

"Hellsbells, yes! I was born there."

"Fine! You will be right at home."

"Just one minute," interrupted Wright. "Once we are at Tiptonville, what are we going to do? What *can* we do, just the three of us?"

"I have not the least idea," answered the Englishman: "I have been in Tiptonvilles all over the world, and I never know what is going to happen or the part that I am to play in them till I get there. So far, I have always been able to get back to London. I feel that we are up against bigger game than I have ever hunted before, but that does not make me change my mind."

"By big game, do you mean elephants?" asked Ormond.

"Not exactly. Now, as to the part we are going to take in preparing for this trip. We will each of us take the clothes we wear and enough condensed food to last two weeks. A gun and a brace of revolvers for each of us might be of use; perhaps they would only be in the way. You can suit yourselves about being armed. And I believe that is all."

"No scientific instruments?" asked Wright.

"Absolutely none. I have an idea that we will find scientific equipment that will make our instruments of precision look like children's playthings."

"May I ask just one more question, Sir Harry?" said Wright.

"Certainly."

"Why do you want a scientist and a hunter along with you, if you are not going to take any instruments and will not even go armed yourself?"

"For this reason. If we both come back, I want a scientist to support my story. If I die, you will have the intelligence to tell the world what happened. As for our friend, Ormond, every once in a while I have found it a good idea to have a man in the party who can shoot straight to the mark. I never shoot except as a last resource; but when it has to be done, it is very important that the bullet lands in the right place. Suppose you lads leave

me now. We have much to prepare to leave New York tomorrow."

The very next day the party of three, Sir Harry Brunton, Mallory Wright and John Ormond, left New York for Chicago. There the Englishman spent a few hours between trains, talking with a fellow anthropologist. Several hours later found them in Cairo, Illinois. There they went to a hotel, and when they left it, by the back door, they looked rather like average rivermen. John Ormond had made many suggestions in regard to their clothing, and it was he who insisted that they remain in seclusion in their hotel room till they had grown a three days' beard.

Sir Harry protested:

"I have been all over the world," he exclaimed, "and I have never missed my daily shave. In London and Paris I shave twice a day."

"You cannot do that and look like my home folks," insisted Ormond. "Some of them never shave, just cut it off once a year with a scissors and use it to stuff their bedticks with. You said you wanted to go to Reelfoot Lake, looking as though you were an old inhabitant coming back to Old Home Week. You can't, because you're too intelligent looking, even with a three-day beard on. But you can't shave every day, not around Reelfoot, sir."

From Cairo they went via Lilbourn to New Madrid where they slept at a cheap hotel on the river bank. The next night they started to row down the river.

"This here old Mississippi River is a funny old thing," explained Ormond: "Sometimes it is asleep and then at other times it raises hell. We will row across and at the same time let the current carry us; and by the time we land on the Tennessee shore we'll be just right for making Tiptonville by breakfast time. Ever read 'Tom Sawyer,' Mr. Brunton? Oh, the devil! I just can't get the hang of calling you Harry. Tom used to do a lot of work on this old river, and he saved Becky when they were lost in a limestone cave. Twain knew a lot about this region."

Sir Harry stopped long enough to light his pipe; then he picked up the oars again. (The three men were taking turns rowing.) At last his shift was up and he gave the oars to Wright, and started to talk:

"It might interest you to know that I once spent a whole day in that Tom Sawyer cave. Of course, it is very small, compared with many others. I like to go through a large cave, Mammoth Cave in Kentucky, for example; there is a cave that we know practically nothing about. There is a new one down in your great Southwest, and another in Virginia. The entire subject has been only partly studied. Men spend years in Arctic explorations while, if they could only be made to realize it, there are just as interesting opportunities right under their feet. Of course, you realize that the cave was the first home of mankind?"

"I thought the trees were," said Wright, who was beginning to puff from his unusual exertion at the oars.

"You are right, so far as man's ancestors were concerned; but just as soon as he came out of the trees, he hunted shelter and safety in the caves of the earth. I am going to go to sleep. Wake me when it is my turn to row."

CHAPTER VII

Brunton's Hypothesis

THEY reached the shores of Tennessee just as day was breaking, and pulled their boat up on the bank.

"I think that it might be best to sit here for a few minutes," explained Sir Harry: "There are some matters that I want to talk to you about. First, I want to ask Ormond a question. Is there any part of Reelfoot Lake that is unexplored, or that has been shunned by the hunters and fishermen who lived around here?"

"Yes. There is; but how did you know about it?"

"Simply by doing a little thinking. I made up my mind that there ought to be such a place. Now, tell us about it."

"Not much to tell. It seems that this lake we are going to, old Reelfoot, was formed overnight. After it was all over, those who settled round the lake didn't come too close, because they never could tell when it would start sinking again. But the trappers and fishermen and happy-go-luckies, they saw that there would be lots of easy food and good trapping, and they decided to take a chance. Land did not belong to anyone special then, any more than it does now. I suppose the proper name for most of the people would be squatters. Give them a pipe, some salt pork, flour, tobacco, a rifle and fishing pole, and they would be happy for life!

"But right from the first they were leary of the entire north end of the lake. That was a long time ago, and it is hard to tell just how the idea started; but the way it was told me was that men went up there and never came back—and at last it was just naturally felt it wasn't healthy to hang around there. Last time I was home, visiting, I tried to hire some of the best trappers to row me up there, and they turned me down flat. But they wouldn't give any reason. So, I suppose that for over a hundred years there have been parts of that lake which were never visited by any man, white or black."

"And you know where those parts are?"

"Certainly! More than once when I was a boy my pa thrashed me for just bragging that I was going to go there."

"Then that is the part of the lake we are going to. How about a boat?"

"Have to make one, I guess, unless we find a cedar one that hasn't rotted under the mist."

"Any anakes?"

"Snakes? Lots of them. Some called cotton-

mouths. Big around as your arm, and deadly poison. Alligators too."

"Do you think that we had better row up the lake, or walk along the shore till we get opposite this unknown part?"

"I don't see how we could walk along the shore. Most of the lake hasn't got a real shore; just swamps and quicksand and deep mudholes. Right at Tiptonville the ground is a little high and dry. If we can get any kind of a boat, I would feel a lot safer on the water than I would trying to walk around the shore."

"That sounds sensible. Now, gentlemen, this is what I have on my mind: I feel that the civilization of the world is threatened by these people who call themselves in our language 'The Conquerors.' I think that this is just a name that they have taken from our vocabulary, because it has a certain impressiveness. They think that by using that word they can the more easily scare the human race. This attack on this section of the States is probably the beginning of an effort to destroy the human race. The time will come when either these unknowns or the peoples we represent will have to disappear. Since they first started to send their messages, I have tried to imagine where they are, how many of them exists, and just what kind of a social order they form. The so-called 'ambassador' told the President that they are as far above us in their power as we are above the ape. That is a rather broad statement, but it is horrible to contemplate if it is true.

"I desired to locate them, somewhere on this earth. Most of the earth's surface is rather well known, though, of course, there are some spots that are imperfectly mapped. Certainly these people could live neither in the sky nor under the water. There is just one place left, and that is under the earth—cave dwellers. Now, follow my argument; because it is important that we all understand each other. The first message forbade planes from crossing over the territory of five states. Why? There are parts of these five states that are practically inaccesible to the foot of man; but a man in an airplane can see everything. He can not only see everything, but he can take pictures of the terrain that are absolutely accurate. The United States was planning to make an air survey of its entire territory. For some reason, these strange people did not want it done; so, they issued an order, forbidding all flights over this territory. They not only refused to allow flights, but they made flights impossible. Then, as though this were not enough, they determined to have undisputed occupancy of the five states. In making this demand their 'ambassador' was killed. They at once started to drive the inhabitants out with a mist. That mist was like the one I saw in Asia, where the people had a deadly fear of it.

"Now, to the east of us is Reelfoot Lake, which was formed over night in 1811. For some reason the squatters who were afraid of neither God nor the Devil were afraid of the upper end of that lake. They were still afraid of it when the mist came and they had to leave. If they came back, they would be doubly fearful. Why? Things happened after the lake formed, and something fearful was stamped into the minds of the people—a deep conviction that, up at that end of the lake, there is something that had best be left alone.

"The three of us are going up there; if necessary, we are going to live there for a while. I want you to remember that, only rarely, in handling people of unusual intelligence, is it necessary to shoot. If you do shoot, do so as fast as you can and shoot to kill. But remember that the great factor of safety is to keep cool. No matter what happens, do not show any surprise. All in the day's work. Is my meaning clear?"

"Do I understand that you are going up there to actually meet these people?" asked Wright.

"Certainly. And I hope that they will find us and make us prisoners. That is one reason why I am not going armed. Lots of this trouble might have been avoided if that 'ambassador' had not been shot."

"Perhaps it may be necessary to do a little shooting," commented Ormond, hopefully: "A shame to bring this big elephant gun along and not get a chance to use it, and I brought along a fine Winchester for Mallory. Aren't you even going to carry a revolver, Sir Harry?"

"Yes, I think I shall; it would be handy in case we meet one of those cottonmouths and I could use it on you if you call me 'Sir Harry' again. What say we eat a little breakfast?"

A Strange Boat

THEY ate breakfast rather silently. It was not a silence of depression or even of apprehension, but was due to the fact that all three of them felt that they were going into an unknown country to face conditions that were perhaps unprecedented in the history of mankind. Theirs was the tension of the runner, just before the race, the breathlessness of the soldier, a few minutes before the zero hour. They ate, because it was the normal thing to do after their night of exertion. What they all wanted to do was to be on their way.

After fighting their way through the underbrush of the river front, they at last reached a roadway. It was covered with a peculiar moss but, when this was pushed aside, the remains of hard-surfaced paving were found underneath. Ormond took out his compass, studied it for a few minutes and then said that this was the old road from the river to Tiptonville, and that it was a walk of only a few minutes further to the lake shore.

The walking was hard, for the moss on the road was in many places over six inches high. At the same time the walking was better in the road than on the sides. The vegetation was profuse, and almost matted on the fields.

"What do you think of those weeds, Wright?" asked Sir Harry.

"They are the tallest I ever saw. Over there is something that looks like blue-grass, but it must be at least twelve feet high, and there is golden rod, nearly as high, and some asters, with blossoms six inches in diameter. This moss is new to me. How did it ever get a start like this on a hard road?"

"I think that this is all easily explained. Remember the mist; for a year this country was dripping wet all the time. There was no sunshine, but there was lots of water. Now there is sunshine and, no doubt, the ground is still soaked. And then it is hot here, almost tropical. Exactly ninety while we were eating breakfast. Heat, sunshine, water are three partners that are able to make anything grow. I must admit, however, that this moss is peculiar. It seems to have a specific rotting influence on the road. Perhaps it was planted here for that purpose, to destroy the road as soon as possible."

"At least, there is one thing to be thankful for," added Ormond, "and that is that we decided not to pack much of a load. I was born down here, where men never made mules out of themselves and where they had niggers to tote their loads for them. Hope we will find a boat."

"Why not throw aside that elephant gun?" asked Sir Harry: "That weighs almost as much as all the rest of your load."

"I would rather throw away the flour and bacon. Might need that gun."

Though the actual distance they walked was only a few miles, it was well past noon before they came to the deserted town. Ormond silently led the way through the silent street, lined with houses in all states of dissolution. At last he came to a central square. There he put down his gun, threw his pack off his shoulders and announced:

"This is Tiptonville."

"Is this all there ever was to it?" asked Wright.

"What do you expect? Right smart town, but, of course, it was nothing like New York. Shall we have dinner?"

"Not yet," answered Sir Harry: "Better go down to the lake shore."

A few minutes' walk took them there. Ormond looked around in astonishment.

"Doesn't look like it did," he said: "I know what is the matter. It's those weeds. Here is the old boat landing all right, and we used to be able to see a lot of clear water in front of us. It was deep a hundred yards off shore. Even if we build a boat, we will have to cut down those cat-tails to get the boat out to the water."

"I do not think that we shall have to build a boat!" exclaimed Wright: "I guess my eyes must be sharper than yours. There is a boat waiting for us. Over to the left. See it?"

Ormond started over, but Sir Harry called him back:

"Wait a minute, my lad. My word! How impetuous you Americans are. Could have saved many lives in the last war if you had been willing to wait a minute. We eat now."

Ormond came back, crestfallen.

"I thought you wanted a boat; and, now there is one, you won't even go and look at it."

Sir Harry never replied to that, but merely started in to do his share towards preparing a meal. It was not till that meal was finished and the pipes lit that he started to talk:

"I want you lads to listen to me. This game we are playing is a sporting proposition though, so far, we do not know all the facts about it. But there is one rule that I want to impress on you. From now on, whenever you run up against anything unusual, walk around it three times and keep as still as you can; and then go off and think it over before you take any definite action. We know there are not supposed to be any human beings around here. All one has to do is to walk through this town and see for himself that the place is deserted; not even a cat. Everything dead and decaying, and even a macadamized road disintegrating. The lake by the shore is a mass of water weeds. Any boat left here a year ago would have rotted and sunk in the mist. Yet, here is a boat.

"Did you look at that boat? I did, and this is what I saw about it. It is tied to a tree and the rope looks as though it were new. Not only has the boat been painted and varnished, it has had all the brass work polished; it shines in the sunlight. By the shape of it, as I see from here, it is a power boat. It certainly is not a rowboat or a canoe or dugout of any kind. I didn't intend to be in too great a hurry in regard to that boat. My word! Do you lads know what I think?"

Ormond replied that he did not have the slightest idea, but Wright answered, almost eagerly:

"I think that I know, Sir Harry; though, of course, it is a silly thing to think. You have an idea that this boat was put there for our use?"

"That is a bright lad, Mallory," replied the elder man kindly: "I believe that I am going to make a real thinker out of you before we get back, if we ever do get back. There is only one way to look at that boat and that is to feel that it was put there for our use. Now, suppose we follow that line of reasoning; if it was put there for such a purpose, the parties who did so knew one thing."

"What was that?" asked Ormond.

"Simply that we were going to come here. They knew that we were headed for Tiptonville. If they knew that, there is a likelihood they knew our plans in New York City. There is something to think about, and there is only one possible alternative; that the whole thing is simply a peculiar coincidence. Yet, such coincidences are rare in my experience. Suppose we take our things over there, pull it up to shore and take a close look at it?"

The Decision

THEY did so. At least, they made as careful an examination of the boat as they could without actually touching it. There was no doubt about its

being new, and behind it was a narrow channel, cut through the weeds to clear water. There were no oars, but at the stern there was something not unlike a small gas engine. Sir Harry turned at last to Ormond.

"What do you think of it, Ormond? You are the sportsman of the party."

For once Ormond deliberated before giving an answer. He not only deliberated, but made as careful an examination of the boat as he could without stepping into it. After ten minutes, he gave his opinion.

"That is the most peculiar motor I ever saw. Looks like a gasoline engine, but it is different; I cannot see how a man could run it. There is a propeller there, and of course the engine, whatever kind it is, makes the boat go; but it does not look right to me."

"Think you could start it?"

"I could try."

"What is your advice, Wright?"

"We understand the boat part, and we could make poles or oars. I am in favor of throwing the rest of the equipment upon shore."

"Under ordinary circumstances I would agree with you. I made up my mind a little while ago about that boat. If it was sent here to take care of us—then, just as soon as we are in it and start the motor, we shall be taken just where those people want us to go."

"You mean that it is electrically controlled by radio?" asked Wright. By this time he was more than interested.

"My word! You saw through it. Ten years ago that would have had us guessing; but the robot is rather overworked by this time. I think that the idea is to have us sit down in the boat and start it, and then we will be carried automatically to our destination, on a radio beam, or something like that."

"Then you really think that everything points to the fact that someone or other knows all about our coming?" There was no doubt about the fact that Ormond was interested in the Englishman's answer.

"I believe it. Yes, why not put it to the test. Suppose we turn the boat around, start the engine and let it go chugging out to the lake without any passengers? It will be interesting to see what happens."

Acting on this suggestion, the three men pulled the boat to the shore, and, after a good deal of trouble, started the engine, and off the boat went. The water lane, cut through the mass of weeds, pointed straight out to a body of clear water. Sir Harry followed its course through his binoculars.

"Just as I expected," he finally whispered, almost to himself. Then putting his glasses away, he looked to the two Americans.

"They turned the boat around out there and now it is on its way back. In some way the people who are at the head of this business found out that there is no one in the boat. See, there it comes up to shore. Clever. My word! No name for it. Boat acts like a water spaniel retrieving a dead duck. Three dead ducks, perhaps. Mallory, tie the boat up and we will decide on the next step."

The anthropologist made himself comfortable, covered his face with his hat and apparently went to sleep. Ormond took out his jackknife and started to whittle. Wright made some notes in a little pocket diary. At the end of an hour Sir Harry took off his hat and started to talk.

"Just three things to do, my lads; we have to make a choice. Either get in the boat and let them decide where we land; take the machinery out and row, or pole the boat; or make a boat of our own. What do you think?"

"You decide that, Sir Harry," suggested Ormond.

"Not at all. Wright, how do you look at it?"

"I suppose you think that 'The Conquerors' are back of this, sir?"

"Who else could it be?"

"For the sake of argument, let's suppose it is. So far, they have shown no disposition to be bloodthirsty. Of course, they drove everyone out with the mist, but they did not kill the people; and I am sure it would have been as easy to have killed everyone as not. Now, they must be expecting us; or, at least, everything looks that way. They want us to come to them since, for some reason, they cannot come to us—or don't want to. This looks to me like a test of some kind. Perhaps all this is not very clear reasoning, but I think we ought to get in that boat, start it and see what happens."

Sir Harry reached over and slapped Wright approvingly between the shoulders.

"Bravo! Mallory, old chap! That was just the conclusion I had reached; but I wanted you to do some independent thinking. If anything happens to me on this trip, you will have to get Ormond out and do what you can to save our race. I am going to tell you all I learn, but there may come a time when you will have to act independently, and, when that time comes, it will be well for you to know how to think clearly. So far, I feel that we have done the right thing. Our sending the boat out to the lake without passengers has shown them that we realized the threatening danger; while our going in it when it starts the second time, will show that we are willing to face that danger, no matter what it may be. So, if it suits you two, suppose we start out on the trip?"

CHAPTER VIII

The Brakes Off

THE party did not have much baggage, consequently, it did not take long to put their possessions in the boat. Then the little craft was turned around and pointed to the open water. With the three adventurers aboard, it started on the journey into an unknown future.

Reelfoot Lake had some sheets of open water. Much of the submerged territory, however, was covered with floating swampage and even cypress trees. Through these islands of cane, brush, moss and mud, there were long tortuous tracks of water, only

a few feet wide and perhaps a mile or more in length. For five miles the boat went up the lake, at times through clear water and at other times through narrow channels, twisting and winding so that it was hard to be certain of the points of the compass. All that the three men had to do was to sit still. The propeller steadily drove the boat forward in silence, while an unseen electrical hand steered its course.

Ormond watched it all with steadily growing admiration.

"I'll have to hand it to the guy that is doing this!" he finally exclaimed: "He couldn't do better if he was an old swamper. This here is the worst part of the lake. More than one tenderfoot's been lost right here; but this old boat goes along just as if it knew the way."

Sir Harry tapped Ormond's knee to secure his attention. Then he whispered gently:

"Just as soon as we reach the part of the lake which nobody wanted to explore or fish in, I want you to give me a signal. Must be something there to interest us."

"I will do that little thing for you," replied the sportsman: "Any objection to my looking over the gun?"

"I certainly have! Forget that you have one. Watch for landmarks; does anything look familiar to you?"

"In places; we are nearly there. That is what I have been looking for, that tall pine to the right. Pine on right side and little hill on the left, 'Run a line between them,' my pa used to say, 'and if I catch you going past that line, I'll whale the life out of you, provided you come home alive, which I doubt'."

"Then, right now we are in the forbidden water?"

"You bet we are!"

"My word! How odd! Nobody here since 1811. At least, no one came here and left again. Odd! Perhaps we have the explanation for it there."

He took the glass and gazed steadily up the lake. Then he handed it to Wright.

"Looks like a mound or a low crater, right in the middle of the lake, with clear water all around it," he remarked: "That corresponds with everything else. Things have just got to correlate with each other. We may find a lot of most unusual and interesting features on this trip; but they will have to harmonize with everything else. Things do not just *happen* in the natural world; they develop. It may take a year or ten million years, but it is never spontaneous. Of course, the mist appeared at first to be unprecedented, but I have seen the same sort of thing in Asia; and, when we reach the solution, we will probably find that the mist in Asia and the mist in North America are both caused by the same natural forces. If that be true, back of these same forces we will find the same intelligence possessed by the same human beings.

"I call them human beings, because I do not know any more suitable name. That poor chap they killed and dissected in Washington was certainly a man. He was different from ourselves; but what else was he, if not a human being?

"For years I have read all the scientific fiction I could lay my hands on. Some is good and some is not so good and some is rather poor. The good stuff is good because it is natural. It may be imaginative and almost improbable to the unthinking; but it sounds to me as though it might happen, and if you grant certain premises, the conclusions are correct. Millions of years ago the Creator started certain forms of life. Some forms advanced just so far and then had the brakes put on them; others kept on developing. Now, if a writer can calculate what might have happened to a race if the brakes were left off, we may get some startling conceptions from him.

"Right now we are in a science-fiction novel. We are doing more than writing it; we are living it. We must try to imagine the difficulties we will meet, and prepare for them as best we can. But in all our imaginings, we must not allow our minds to dwell on the impossible. For everything we see there must be a sound scientific explanation, and if that explanation is lacking, it is simply because we do not perceive it. For example: Suppose we are shown a two-hundred-foot monster standing erect and then are told that the Behemoth has no skeleton, no backbone? What then? Just smile and say, 'My word!' or 'Hot Dog!' but all the time remember that the animal does not exist. Perhaps it is only a clever moving picture."

As he was talking, the boat increased its speed and rapidly approached the edge of the crater. Nearing this, they saw that it rose about twenty feet above the water level. The boat headed for a landing, from which ascended a series of steps to the top of the crater's rim; and slid gently into a close-fitting berth cut out of the hard clay. The motor stopped.

"Here we are!" cried Ormond, in a forced attempt at gayety.

"What shall we do now?" asked Wright.

"Let's wait and see what the program is," suggested Sir Harry.

They did not have to wait long.

Down the steps came a small, peculiarly-shaped

"Am I right in assuming that you are Sir Harry Brunton?" he asked in a tone that seemed the purest English accent, yet one that even to the Oxford-bred Brunton had a rather artificial ring.

"That is my name, sir," was the Englishman's reply.

"And these men are your servants?"

"Hardly that. They are my companions. Allow me to introduce Mr. Mallory Wright, a scientist of no mean attainments, and his friend, Mr. John Ormond, a financier of New York City, who is noted for his ability as a hunter of big game."

The stranger merely glanced at the two men and then turned again to the Englishman:

"You are the one we are expecting, Sir Harry. We will allow the other two to return to Tipton-

ville and live there. Of course they cannot leave this area."

"They have no desire to do so. The three of us stay together. It is flattering to know that you expected me to visit you; but I can not think of asking my friends to miss the pleasure of the trip after they have come so far. Shall we disembark?"

"No. You will stay in the boat till I find out about these men." And saying that he turned around, went up the steps and disappeared.

The Pit

BRUNTON motioned to the two to draw close to him. He whispered: "That is a twin of the man they shot at the White House. Look at the hydrocephalic head, the large forehead, the little chin, small arms, large hands, little legs and feet. Not over four feet high. Look at those eyes when he comes back. I think that we are starting to learn something."

It was late in the afternoon and exceedingly hot. There was neither shade nor breeze on the side of the crater where the boat was stuck in the little dock. After what seemed hours to the New Yorkers, but had been actually a little over ten minutes, the hydrocephalic dwarf came back. His face was expressionless, and he shaded his eyes with his hand as he explained:

"There was a delay. A conference was being held. The final determination is to admit the three of you, if Sir Harry Brunton will assume full responsibility for the acts of the other two."

"You consider me the leader of the party?" asked the Englishman.

"We consider you our guest. The other two are either servants or useless impedimenta. To be plain, their presence here annoys us."

"They are coming with me. I consider that they are my friends. It is immaterial to me what you call them."

"The matter is not one for argument. You will follow me up the steps."

The three men started to arrange their packs and left the boat. Up the steps they went, to the top of the crater. Pausing here, they gazed around them. Far on either side stretched the lush swamps and cypress of the lake shores. At least half a mile away, across the hole was the further rim. From the water the crater had looked like a mound of dirt, fifteen to twenty feet above the water edge. From the top of the rim it was a hole, half a mile wide and interminably deep. The sides went down cleanly. It was a gigantic cylinder, a terrific well so perfect in its roundness and smoothness that it gave the appearance of being bored by the well-tools of a Titan.

"My word! Remarkable!" exclaimed the Englishman: "I have seen some holes, like the diamond mines in South Africa, but this is really the most perfect example of a boring I have ever seen. I wonder if there are any bones at the bottom? No one can tell from here how deep it is, but it must be miles."

"Your audible thinking is remarkable," commented the guide.

"Do you find it so?" quickly replied the anthropologist.

"Absolutely. It has caused considerable comment among those who have heard it."

"My word! Yet, I will say this: Sometimes I sit and think out loud, and sometimes I just sit and think silently and then, at times, I just sit."

The guide looked at him with that odd, expressionless face which so far had shown no evidence of interest in anything that had happened.

"It would seem," he said, "that you are endeavoring to indulge in what you call humorous language. We do not take pleasure in the action of laughter, as you seem to do. That is one of the primitive expressions which we learned to be useless, many thousands of years ago. A few of us have tried, for purposes of research, to rediscover the method. The one who was killed could laugh so that it sounded very much like the laugh of you Middle-Men. I heard him several times; but I did not like the sound. Besides, there was no necessity for it."

"Why do you call us the Middle-Men?" asked Sir Harry.

"Because you stand between the ape and the truly civilized," was the matter-of-fact answer.

"You interest me. It is all so absorbing in its unusual novelty. Now, I am sure that there are bones at the bottom of this hole. Am I right?"

"Partly, but not altogether. Your knowledge shows your comparative erudition which alone makes you interesting to us. Now, with regard to the bones; I am asked to show you something. Leave your property here. We will return; besides, there is no need for you to carry it. Follow me."

They walked behind him for over a thousand yards, along a well-beaten path around the top of the crater's edge. The rim was well over fifty yards wide, but the hole was so deep in proportion to the depth that it seemed as though they were walking on a knife-edge. Soon they saw a platform jutting out over the void; though it was well-built and able to bear a hundred times their weight, it made the three men almost giddy to walk out on it to the heavy rail that protected the edge. They were now twenty feet away from the edge of the crater, yet they could not see the bottom of the hole; that was simply lost in impenetrable blackness.

They were standing there, holding to the railing. Finally the guide called their attention to a long wooden chute that started near the platform and projected over the gulf for fifteen feet beyond, ending in a sharp dip.

"What does that look like to you?" he asked.

"The shoot-the-shoot at Coney Island," answered Wright.

"It seems to be some kind of a toboggan track," whispered Ormond, his face a ghastly white.

But Sir Harry simply turned and asked:

"Is it slippery?"

"It is. We have a purpose in showing you this. Whenever we have visitors, we show them this;

it is what you call so peculiarly a lesson in life. In a few minutes another Middle-Man will be here. We did not want him to come; you recall we sent a message, warning the Middle-Men to stay out of the forbidden land. This man came; we used him as we could. Then he tried to escape though he had been warned of what would be done to him. Now, he will serve as a lesson to you servants from New York; I am sure that Sir Harry Brunton does not need the lesson."

"My word! But there is no objection to my watching, even if I do not need it, is there?"

"None at all. Your value to us will be in direct proportion to your ability to understand us. These two with you are of no value to us. They are here, simply because you requested it. Here comes the Middle-Man; he moves slowly, but he moves. Would you like to talk to him?"

"Fine idea," exclaimed Sir Harry: "He might have a last message or something."

Ormond's Sacrifice

THE man came shuffling along the worn path of the crater. He walked as though each foot were weighted down with lead. His face was covered with the grime of months and a matted beard. What garments he had were more rags than clothes. Now and then he turned around and looked behind him, and when he did so, he cried, as though in pain. After an eternity of waiting he dragged himself out upon the platform.

"Are you ready?" asked the guide.

"Yes, yes! Anything is better than that unending torture."

"You go cheerfully, willingly?"

"No! Oh!—yes. YES! Make them stop it!"

"What are they doing to you, my man?" asked Brunton coldly.

"They stab me with fingers of fire. Look at my back. For months they have driven me with those sparks. See my back?"

And he tore off the few rags that covered him and turned around. His shoulders and back were covered with burns and scars of old injuries, none of them much larger, however, than the head of a pin.

"My word! But you brought it all upon yourself. Why did you not do what they told you to do?"

"I tried to, but it was hard, and I wanted to get away. I thought it was my duty. I have an education; I owed it to my country to warn them. They played with me like a cat with a mouse. I was starting to swim the river when the electricity forced me back. Oh! I came back willingly; but who wouldn't when those things were stabbing you all the time?"

"I guess we had better hurry along," interrupted the guide: "You know what you have to do, so, do it!" he ordered the trembling wretch.

The man turned around and started to walk to the toboggan. Ten feet away he turned and ran back, throwing himself at Ormond's feet.

"John! John! Can't you do something to save me? Don't you know me, John? Don't let them do it to me. Say something, please say something to save me!"

Ormond looked down at the pleading man, and then kicked at him with his heavy shoe:

"Get away from me, you dirty bum! Who do you think I am, anyway? What do I care what happens to you? Get out!"

The wretch shrieked and started to run for the chute. He threw himself into it headfirst and shot down it into the gulf below. As his body left the supporting framework and struck the air, he gave a scream, a loud piercing screech that echoed back and across the gulf, and finally died away in the depths below.

"My word!" exclaimed Sir Harry Brunton. "Serves the bounder right. No man should go where he is not wanted. Bones down there? I should say so. Clever idea. No blood. No one to blame but himself. Good riddance."

"It is well that you approve," said the guide: "We will go down now, but we will take the escalator, or shall I call it elevator or lift? Your language is so peculiar; why have so many names for the same thing? I will go and arrange for your belongings. In the meantime, walk around the platform and enjoy the scenery."

He left. Ormond, white as chalk and sweating, was trying hard to fight off a fainting spell. He rubbed his arm above the elbow.

Sir Harry Brunton held him on one side, while Wright fanned him with his hat.

"Good work, John, my lad," whispered the Englishman: "You remembered. Always remember to do what is expected of you. You nearly forgot, but I got hold of your arm just in time, and I fear you are badly bruised from my fingers. You were splendid. Tell me, John, how did you know the man? He seemed to know you."

Ormond shut his eyes as he answered:

"That was Paul Ormond. He taught in the high school at Tiptonville."

"Ormond?" asked Mallory Wright.

"Yes. He was my brother," cried Ormond, covering his mouth to keep from crying.

CHAPTER IX

A Questionnaire

IN ten minutes the guide returned. Following him were some pitiful-looking human beings who carried the packs and impedimenta of the three explorers. On the faces of these beings was the same hopeless, forlorn expression, the same cringing, fearful look that had characterized the face of Paul Ormond. Their torn clothes, ulcerated skins, and hopeless, filthy faces were in strange contrast to the neat and spotless appearance of the guide. In their doom they seemed strangely apathetic, as though the worst had befallen them and nothing else that happened in their lives could do them further harm.

With a gesture the guide directed Sir Harry

Brunton to follow him, and the rest of the party descended into a metal cage, which dropped slowly down a shaft into the earth. After what seemed an interminable time, the elevator stopped, a door opened, and the guide, without a word, walked out, beckoning the three men to follow him. Through long corridors they walked and, at last, they came into a room that seemed comfortably equipped for living; though all the furnishings were of peculiar shape and construction.

"This is to be your room for the time being," the guide said: "You will find in it all the things to which you have been accustomed above. Over there in this white space set back from the wall is what you would call a television sheet. At the side you will kind a key-board with one bank of letters in your language. If you want to see any special country, city or man, write the names on this key-board and press the red button. If you want to also hear what the men imaged there are saying, press the blue button. To discontinue pull forward the lever with the yellow handle.

"The apartment contains a place for you to bathe and shave, and you will be provided with food. To-morrow morning you will be summoned to a conference. I am sure that you will sleep well. We are leaving all your property with you. But you cannot escape; I will show you."

He walked over to one of the cringing beings who had carried the baggage into the room; the slave looked at him with listless eyes.

"What is your number?" he asked softly.

There was no reply. Without a word he extended a tube drawn from a pocket and pointed it at the being with his finger. There was a crack; electricity seemed to leap from the tube and pierce the cheek of the slave. A bluish mark appeared, and there was a cry of pain, piercing in its intensity.

"Now, then," the guide repeated, "What is your number?"

"7590, sir."

"Show me your tag."

The being held out its hand; a band had been clamped about the wrist, and to this band was fastened a metal tag, with the number upon it.

"What is your name?"

"Barbara Ward, sir."

"One of those useless women! I forgot there were any of you left. How did you come here?"

"My man and I did not want to leave our home. We stayed and you made us come down here, sir."

"Where is he now?"

"He tried to get away, sir."

"What happened?"

"You made him throw himself down that slippery plank, sir."

"What happens to all who try to go back to earth?"

"They are driven down that plank, sir."

"Correct. The next time you are questioned, answer at once. Now, go back to your level, all of you. Quick!"

He turned to the three men, who had been listening intently to the dialogue, and said:

"And that is what happens."

Sir Harry Brunton smiled as he replied:

"My word! How the brutes smell! They seem to be a very low order of sub-humans."

"You are correct," answered the guide: "Now I will leave you. Keep your watches wound. The conference is set at eight o'clock of your surface time, tomorrow morning.

The three men watched him leave with bated breath until they were certain that he was really gone. Then they looked at each other; the Englishman was the first to speak:

"I am going to have a bath and shave. No need now for further disguise. Suppose we make ourselves presentable, what say? Then we will have supper and play a while with the bally little typewriter."

They had hardly finished their toilets when a bell rang, an unseen door on one side of the room opened, and a table, with food on it, rolled slowly into the room.

"Dinner is served. Let us eat," said the Englishman softly. He seemed to be in the best of humor; but the two Americans were more than depressed.

"Cheerio! Ormond," exclaimed Sir Harry: "Smile a little."

"I can't. Not just now. If I were a Red River pea and were planted an inch deep, it would take me three weeks to break through the soil, I feel so downhearted. I don't see how you keep going, Sir Harry."

"That's easy to understand, my lad. I came here to find out some things; I am finding them out. Let us eat and be merry; for tomorrow we will see things hidden from the eyes of Middle-Men, and the day after that we will see more things—and—"

But Wright finished the sentence for him:

"And the day after that we will be driven by those electric sparks to the shoot-the-shoots and that will be the end of learning these things."

"My word! You Americans think of the most frightful things and I thought that you were buoyant. My supper was a success, but you two hardly ate a thing. Have to do better than that. Let us wander over to the typewriter. I feel like an evening of merriment and mirth."

The machine was on a stone table near a white space on the wall of the room.

"Let's see little old New York," suggested Wright.

"No!" whispered Ormond intensely: "I just couldn't stand to look at Fifth Avenue and Forty-second Street just now. Sir Harry thinks there is a lot of humor in all this, but I want to see it all from another angle. Oh! I don't want to be nasty; but where I was born and raised we thought a lot of our folks. Let's see what happens."

Sir Harry pressed the keys of the machine. First he wrote "7590," and then as an afterthought, "Barbara Ward," and with his index finger slowly bore down on the red button on the left side. The room plunged into darkness, and the white sheet developed a glow that in a few seconds became a dis-

The End of Barbara Ward

THE picture showed a long room, lighted with the same concealed illumination that had flooded their room. In two long rows, down this room, things that had once been men and women were trying to sleep. On a platform at each end sat large monstrosities, in the shape of men, yet bearing a strange resemblance to pieces of machinery. Their arms were stretched out as though in silent benediction over the sleeping masses. Yet, their hands held tubes and now and then crackling sparks of electricity would leap to find a resting place in the body of some of the things who had failed to keep a death-like silence. When this happened, a dog-like howl of terror would come from the stricken prisoner.

Slowly the picture shifted till it focused directly on a woman. Her eyes were open, and she breathed rapidly through her mouth. If this were not Barbara Ward, the unfortunate slave who had helped carry the baggage, it was a woman much like her. Sir Harry pressed the blue button, and a voice came from the woman, though her lips hardly moved:

"I can't stand it. My God! I can't stand it. I ought to have ended it long ago. I would have if I had not been such a coward. What is the use of living when there is no hope?"

She raised her right hand—something glistened in it as the mechanical guard threw down the tormenting sparks on her. She had plunged a piece of sharp metal into her heart. She died without a sound. The picture went black with the loss of her consciousness. Sir Harry turned it on again to see sparks hurtled through the air. Men on either side of the body stood up, seized the corpse by the arms and dragged it from the room. The picture followed their progress. Through long corridors they stumbled, their trail marked with the dripping blood, till they came to a hole in the wall; into this hole they thrust the body and then turned back. The picture followed the movement of the body down an incline and then traced its course through clouds and darkening mists till at last it was lost in the darkness.

Ormond leaped forward and took the lever with the yellow handle and pulled it forward. The light on the screen faded and their own room once more became flooded with the sourceless light. The man from Tennessee looked at the Englishman.

"What now?" he asked expectantly.

"Bally fool, that woman!" said Sir Harry: "What did she want to go and kill herself for? Got the floor all bloody, by Jove! Let me get at that machine. I want to see dear old London."

Ormond looked at his friend. Wright simply winced.

Ormond turned, walked over to one of the couches, threw himself on it, and turned his face to the wall. And he was in the land of the dead for the next eight hours.

For two hours Sir Harry played with the machine. He saw a hundred different places, fifty men he knew; he heard the President of the United States talk with his Secretary of State. Wright sat on one side, looking on, but saying nothing and not asking once for any particular scene or person. At last the yellow lever brought back the lighted room. The Englishman lit his pipe and smoked in an apparently thoughtless manner. At last he spoke:

"Mallory, I want to say something to you. You have seen this machine work tonight. It is evidently very efficient in every way. I want you to keep one thing in mind, my lad. These people like me; they like me, because I think in the same way they do. Since I met them I have not only been talking their way, but thinking their way. Now, there is more than one machine like this, my dear boy. Try to get John to see that fact; more than one machine. Everybody likes to have everybody else agree with him, Mallory, my lad; and, personally, I think that these people are handling a very difficult problem in a very efficient way. They are so efficient that it makes us ashamed of the inefficiency of the race that we represent. They want me here for some reason and they don't want you and John at all, at least, not as my companions. I suppose, though, they could use you a while as part of that crowd of rotting humanity. So, tell John that perhaps every room has a machine like this and tell him to be as careful of his thoughts as of his words; because I may have a hard time protecting you lads, and I don't want anything to happen to you. Now, what say we get some sleep?"

Ormond slept that night, a sleep broken by horrible nightmares. John was not a scientist, was incapable of deep mental concentration; but he was very much of a man, and the past twenty-four hours had been hard on his manhood. Wright slept easily; he was tired and he knew that he should need all his strength. Sir Harry Brunton did not sleep; instead, he passed the long hours lying on his cot, slowly puffing his pipe and reviewing the events since they had set foot on the edge of the crater.

The Three Co-ordinators

THEY were all up and active by seven the next morning. At seven-thirty the table of food again appeared in the same strange manner, and at ten minutes of eight the guide of the day before returned. He simply beckoned the three to follow him. The course that he took was confusing; through long, winding tunnels and up and down elevator shafts in metal cages. The visitors were rather relieved when at last he escorted them into a large room and told them to be seated. They had hardly seated themselves on the comfortable chairs, when a door opened, and through it walked three more dwarfs, similar to their guide, but with even larger heads. Without the loss of a minute, the three sat down opposite the explorers and the one in the middle began the conversation.

"I understand you are the Middle-Man called Sir Harry Brunton? You need not answer. The question was useless, a mere formality: We are the three Co-ordinators of our race, ranking next to the

Directing Intelligence. We have come here to meet you and to explain the reasons for your being allowed to come to Reelfoot Lake.

"Our nation is a very small one; in all parts of this planet there are somewhat fewer than twenty thousand of us. We are headed by a member who is called the Directing Intelligence. Under him, immediately, are ourselves, the three Co-ordinators; the name explains our function in the nation. Beneath us are the two hundred Specialists, each of whom is completely equipped educationally to direct operations in his specialty for the benefit of the nation. Under these are a variable number of individuals, whom we call Directors; they are kept quite busy directing our machinery. Of course practically all of our manual labor is done by machinery whose operation is controlled by automatic devices, such as our artificial men. A few Middle-Men perform menial services requiring little intelligence.

"I think that such a simple explanation of the nation will suffice for the time being. The Directing Intelligence lives in the same body for about two thousand years; the three co-ordinators for a thousand, and each specialist is worn out by the time he is five hundred years old. The directors live as long as they are useful. Of course, all of us could live much longer than we do; but we find that there is an age of maximum efficiency past which it is not well to let the individual live. Our constant thought is solely for the welfare of the nation.

"At certain times, examinations are held among the large group of applicants, and successors for all of us are chosen. Then comes a period of from twenty-five to two hundred years of special training of the winners; each winner being trained by the man whom he is to replace. When the teacher feels that the time is ready for replacement, he announces that fact to the co-ordinators and the new individual takes the place of the worn-out person. Since the nation has no further use for the worn-out unit, he is allowed to take a pleasant, painless lethal gas, instead of dragging out a wretched, useless, mentally-impaired existence through a protracted old age. Thus, the efficiency of our complete mental machinery is preserved in undiminished strength.

"We have no sickness here and seldom an accident. We are well protected by our mechanical devices. However, a very unfortunate happening took place some time ago. One of our specialists had made quite a study of the earth people. He prided himself on the fact that he was able to act in such a way as to imitate their mental behavior; for example, he tried to learn to laugh. We selected him as the ambassador to the President of the United States, and the fools above killed him. We had almost forgotten that there are such things as firearms; our specialist in armaments felt very badly about it. So we must make sure that we learn more about races like your own that are far inferior to us, but because of your numbers potentially dangerous. Therefore we have chosen an anthropologist like yourself who will be our consultant, the liaison of information between the civilizations of the past and ours. We have conferred with the Directing Intelligence and decided that you should be that person."

"My word! What an honor! In what did he specialize, this poor fellow who was shot?" asked Sir Harry Brunton.

"He was our anthropologist. We have investigated and found that you were the one Middle-Man who seems to have a sufficiently comprehensive grasp of the subject to be of use to us; so when we learned you were coming to visit us we decided to make use of you. You will of course accept. You will find the work interesting, and the companionship with specialists pleasing."

"It is an honor to accept," replied Sir Harry, seriously: "I know many anthropologists above who would give a good deal to have the chance. There is just one thing that I have to ask. I am not accustomed to machines doing my work for me; I brought along these two fellows, Wright and Ormond. They are just plain, ordinary men, but they like me and understand how to look after me. I want them to stay with me."

"We agree to that. After you become accustomed to our machinery, you will find a mechanical body servant a thousand times more capable than these ignorant animals ever could be. But we want you to be mentally and physically at ease; therefore, you may keep them till you no longer need them. Now, we are going to go and visit the Directing Intelligence. He has held the office for thirteen hundred years; and the nation has made some progress under his leadership. He is very desirous to see you, and has a great many questions to ask you. After that, you will meet with the specialists and be given all the instruction required for your duties."

"It will be a great honor to see your ruler," said Sir Harry.

"We do not use that word here. That is a word of the Middle-Men that has no meaning with us. It is true that this individual is at the head of the nation; but that is simply because he has passed the tests and shown the greatest fitness."

"May I ask the name of your nation?" suddenly asked the anthropologist.

"Our name in our language is *Glow-wahr*, but when we hunted for a word of your Middle-Men to express it, we selected the word, 'Conquerors'," the central co-ordinator replied.

CHAPTER X

The Directing Intelligence

AT ONCE the three co-ordinators rose and asked Sir Harry to come with them. Wright and Ormond went along, as a matter of course. They realized that their position was a difficult and even a dangerous one; but, while they were with the Englishman, they were confident of his ability to protect them. Wright, the scientist, was thrilled with what he was seeing and hearing, but Ormond was simply bored and vexed at the thought that he

was not able to use his elephant gun on these people, whom he considered as nothing but monstrosities. However, he had had a little talk with Wright that morning; and he was able to see the necessity, not only of keeping quiet, but of betraying no signs of anything derogatory to the pride of the "Conquerors."

As they walked through the long halls, the spokesman of the three co-ordinators talked freely to Brunton.

"The Directing Intelligence," he said, "usually stays in one of our eastern centers; but he made the trip to the Reelfoot Lake hole on purpose to see you as soon as he could. That is most unusual.

"Of course, you are only a Middle-Man, but you have gone far in advance of your race. At least, you have very specific knowledge which we need; and we are willing to allow you to impart that knowledge to us. The Directing Intelligence will give you a general idea of our race; although he is not the specialist in history."

As he spoke, they came into a large room which contained only a central table with five chairs around it. At the head of this table sat a dwarf who was different from the others in no detail except possibly that he had a slightly larger head. He remained seated as the party came in. His face was expressionless.

The three co-ordinators sat down at the table and motioned to the Englishman to take the seat of honor on the right of their leader. No attention was paid to the two Americans; and, because there were no chairs for them, they simply sat down on the floor.

"I am interested to see that you arrived safely," the Directing Intelligence began, in a low voice: "Earth travel is so full of danger that we were not sure of the route you would take; but, since you had a good guide who knew this region, we were sure you would arrive in time for the yearly conference of our specialists.

"The co-ordinators have told you the reason why you are here. We want you to supply us with certain information during the period of your usefulness. I know that this invitation has met with your approval.

"I do not say that we are pleased or delighted; for such emotions passed out of our life many thousands of years ago. In fact, as soon as we realized that the emotional states of love, pleasure, hatred, anger, jealousy, fear and passion were a hindrance to our proper development, we took steps to eradicate them from our lives. As you know, these emotions are simply the result of secretions from the internal glands, passing into the blood stream and reacting on the higher mental centers. We eliminated these specific glandular functions, as we have done with many other things, by a process of selective breeding and embryonic feeding. As a race we are emotionless. We are never happy, sad, depressed or elated. We do not know the meaning of fear or pleasure, hatred or envy. We are highly developed and highly efficient intellectual units.

"We have always subordinated the interest of the individual to the better and more worth-while interests of the nation. All this will be more fully explained to you by our specialists. What I am trying to do now is to give you a general view of our life, the life you will live with us."

"I am glad to stay on here with you," said the Englishman simply.

"You should be. You have the honor of being the first Middle-Man who has ever been asked to come to our world. Many have come uninvited and, as you know, they have all stayed. They are useful, in a way; though not nearly as capable as machines. They are more elastic and in some ways, cheaper. We learned all that many thousands of years ago.

"I will give you a brief account of our race. The historian will supplement it; but I want you to get it first from me. As you can readily see, we are human beings, as you are; but more perfectly developed. I cannot tell you when we left the other races of men, but it was approximately a hundred thousand years ago. Our complete records show at least eighty thousand years of life; separate from other earth men.

"We were made into an underground nation by Glomin, a great genius. He had a vision of what life would be on the surface of the earth. He developed the idea that life would be safer, existence more tolerable, the fight for necessities less arduous, if we lived under the earth instead of on it. He saw that extremes of temperature and other atmospheric conditions led to overemotionalism and believed that in an unchanging environment we would develop free of emotions.

"There is no doubt that, when this man and his followers went under the surface, they were similar to the earth men of that time. So we have two streams from the same source, one living on and the other below the surface of the earth. For thousands of years one race of men has lived by brute strength and its emotions; while the other has cultivated the intellect.

An Explanation

"WE changed rapidly. There were no wars to decimate us, no famines to undermine our strength, and diseases were soon under our control. I can safely say that, ten thousand years ago, we had more knowledge and were on a higher plane of civilization than the Middle-Men here today.

"Our specialists in medicine and surgery will tell you in detail of the advances we have made. You will find it all very interesting; and, at the same time it will prove to you that our ambassador was right, on the whole, when he told the President of the United States that our race is as far above the Middle-Men as they are above the ape. Still, you are an exception.

"It may be well to explain to you the reason for some of the events of the last year and a half. We have, in these five American states, several holes, such as the one by which you entered at Reelfoot Lake. They are in isolated spots, and we had been

able to so terrorize the mountaineers that they were more than willing to leave us alone. Your invention of the airplane changed all that; and it seemed to us that the only way to preserve this isolation was by a prohibition of air traffic over our territory. At the time when we issued the first edict, it was thought only that it would be at once obeyed and that there would be no more trouble. The antagonism of the United States was not a part of the anticipated program. But there was only one thing to do and that was to clear the territory of you Middle-Men. And to do this, we used the method that was the most sensible; that of making the territory unfit for you to live in.

"However, we are now ready to extend our plans. I will explain this by saying that, fifty thousand years ago, we prepared a definite program which would give us an opportunity to live out our destiny apart from your race and, at the same time, to allow you Middle-Men, within limits, to live yours. The working out of this program during the fifty thousand years has been most interesting and you, as a member of our staff, should be satisfied to live here and study it in its more intimate details. We will go into that later on. Have you any questions?"

"Several," replied Brunton: "Just how were you able to interfere with the radio waves? What was your method of preventing the planes from flying over the forbidden territory? How do you produce the mist? What general method of living produces your longevity?"

"These are all very appropriate questions. First, all of your so-called modern inventions have been our property for thousands of years. As you see, we still use a form of what you call television, which, with us, is absolutely selective and reproduces not only visible images, but also the sounds. We then undertook successive developments which give us an ability to neutralize the powers that we had discovered. We control a force that is able to refract, or bend all radio waves, so that they converge and are appreciable only at the magnetic poles. I presume you would call it electro-magnetic dispersion. By a second process, using ionic attractors of great size, placed under the earth, we are able to withdraw electrical force so completely from any territory that all electrical machinery is useless. Do not ask me how this is done. When you have an opportunity, you may seek further information from our specialist in the field of electricity.

"The mist is peculiarly valuable. You commented, the other day, on the fact that you have seen similar mist in a valley in Asia. That was our formation, and we made use of it there for the same purpose that we made use of it here. We wanted the population to withdraw, so that we would have complete isolation.

"Of course, you know that the center of the earth is a molten mass. In a few places this breaks through in the form of volcanoes; but everywhere, if sufficient depth is obtained, intense heat can be observed. We bore holes at regular intervals, till we obtain the requisite temperature and then divert subterranean rivers into these holes. Steam in enormous quantities is formed. It rises into the air as steam, high enough to be condensed, and then falls as a mist. Naturally there is a great increase in the temperature, with heavy rainfall and a marked growth of vegetation. However, we add to the destruction by sprinkling over the cities and roads a special powder which has a marked disintegrating effect on iron, stone and cement. We do this from our own airplanes. Naturally, we know how to fly; and our machines are far superior to yours.

"What we wanted to do with the territory of these five states was to eliminate all traces of the Middle-Men. It is simply an experiment; we wish to see whether it would return to its original condition before you began to waste it, and revert completely to a state of nature. In one year we have obtained great success in our work of restoration. I think that in five more years we will have a complete growth of briars and berry bushes over Memphis, Nashville and Richmond.

"Now, there remains one more question. In regard to our longevity, I will tell you that, should we lose sight of the welfare of our nation, it would never be necessary for any of our race to die. The factor we use to determine our life span is our efficiency. Our bodies are practically immortal; our nervous systems, unfortunately, are not. We have a period of maximum mental efficiency, and after that there is a slight decline. Centuries ago, we determined that to wait for that decline would interfere with the upward progress of the nation.

"We combat disease with our leucocytes; the more white cells in our blood, the better able we are to resist infection. In addition to that we live in natural and artificial caves whose atmosphere has been freed of germs. By a process of natural selection we have changed our blood composition till the white corpuscles far outnumber the red. Of course, we still have to breathe and take in oxygen; and since our red cells are very few, we have gradually doubled the size of our lungs, increased the rapidity of the circulation through them, and thus compensate for the diminished number of red corpuscles.

"So, through us flows what our specialist in language calls, 'The Ichor of the Gods.' That is a phrase, however, which means nothing to me. The specialists who cultivate certain arts feel that they can experimentally simulate some of the emotions; of course, it is pure simulation, for we are naturally incapable of emotion.

"We remain few in number by keeping a careful watch on the growth of population. Only the best individuals are allowed to live. Examinations are held when necessary and all who are not sufficiently promising are eliminated.

Into the Lethal Chamber

"WE have just conducted such an examination. Twenty of our specialists applied to the co-ordinators for pupils; a group of two thousand

was ordered to take the examinations. Each specialty has about one hundred students in training; that is about the average size of a class in our preliminary colleges. Out of these the most brilliant member is selected and the failures are either put to other work or disposed of. There would be no need of keeping them without a definite place for them in our economy.

"The disposal ceremony will take place this morning; so that you may see it. I am sure that its efficiency will interest you, especially when you compare it with the childish methods of your Middle-Men. You spend time, effort and wealth in educating millions who, even when educated, are unable to serve any useful purpose and must be supported by the nation. You will accompany me now to the place of disposal."

"It will be a valuable opportunity," was the Englishman's answer, and from the tone of his voice there was no room to doubt his sincerity.

The Directing Intelligence slowly arose from his seat and, side by side with Sir Harry, walked out of the room, followed by the three co-ordinators. The two Americans followed, as a matter of course. They were silent; they were even trying not to think.

After a short walk and a journey in an elevator the explorers found themselves in a great hall at the end of which was a large platform. On this platform a group of white-robed "hydrocephalics" were waiting and, behind them, there was another group in white robes, edged with purple. The hall was filled with other dwarfs.

"These are the twenty specialists and their successors," explained the Directing Intelligence: "Specialists always devote a great part of their time to transmitting their knowledge by personal instruction to their pupils, who will ultimately become their successors. This will be made clearer to you by the ceremony. I will ask the Educational Co-Ordinator to take charge of the ceremonies, and I will sit down. At times the weight of my head is oppressive and I find it best not to over-exert myself. In fact, I think that shortly it will be necessary for me to take steps to have myself replaced."

One of the co-ordinators who, up to this time, had been silent, now stepped to the edge of the platform. He began his short address:

"In making these few remarks to a group of our scientists and their pupils, I am following a very ancient custom of our nation of Glow-Wahr. Twenty of our specialists have asked for pupils, and, out of a class of two thousand, twenty have been selected by competitive examinations. On these twenty the white robes, edged with purple, have been placed. It will be their duty to acquire the wisdom of their teachers and even add to it; so that, when the time comes for the retirement of the latter, the pupils will be able to take their places and thus preserve the continuity of our knowledge. I am confident that you will prove worthy in every way of the honor placed on your intellectual life. I now ask all to form in a double line on either side of the Lethal Chamber door to salute the two hundred who are to be eliminated from our race."

The Directing Intelligence stood up and took Brunton's arm. They led the way to a door at the end of the hall. On either side the specialists and their new pupils placed themselves. Ormond and Wright stood behind, but were well able to see over the heads of the dwarfs in front of them.

And now, from the vast group in the hall there rose quietly and with a predetermined order those students who had failed to prove their right to live. They came in a single line with head erect. Without a sound, without even a change of expression, they marched one by one through the door which swung open to receive them, and swung slowly back before the next advanced. There was no time lost, no wasted motion. Gradually the long line that had formed began to thin down.

CHAPTER XI

An Initiation

At last they were all gone. Two hundred men of this strange race deliberately slaughtered; because they had failed to show their usefulness and their intellectual right to live as active members of the Ruling Minds.

Then came a double column of men, twenty in number. On one side the men were clad in white robes; on the other side the robes were white, edged with purple. Up to them stepped the educational co-ordinator.

"You specialists who have taught your pupils all that you know and, realizing that your mentality is passing the peak of usefulness, have asked for the right to pass through the Lethal Chamber. I will, therefore, ask the pupils to remove their robes."

Twenty of the men did so. Then the orator resumed.

"I will now ask your teachers to invest you with their robes."

Slowly the twenty specialists took off their white robes and invested their former pupils with them. Then the speaker walked to the head of the line.

"As specialists you have served the nation carefully and well. You have added to the general uplift of our race. In leaving us you will have the consciousness that you have never failed to place the race above the individual. You now have our permission to depart. I will ask the new specialists to take their places with their fellow leaders."

And the twenty naked specialists, who had committed no error save that of yielding to the deterioration of time, one by one stepped through the door of the Lethal Chamber to eternity. They, too, showed no emotion; and went to their deaths without a sound.

The Directing Intelligence turned to Sir Harry Brunton:

"Thus," he remarked, "we preserve the intellectual vigor of our nation. I will now have you sent back to your apartment where, this afternoon, you will be visited by our specialist in human biology.

Tomorrow you will be taken to see some of the parts of our nation that will interest you. Now, I will leave you."

Soon our three friends were back in their room. Their guide left them alone and the table, well-laden with food, shot, as usual, through the hole. Ormond looked at Sir Harry Brunton and simply exclaimed,

"Well?"

The Englishman smiled back as he muttered,

"My word! Bones? I should say so."

Most of that dinner was spent in silence. Not till the end of it were the spirits of the New Yorkers sufficiently revived to permit of conversation. Suddenly Wright said smilingly to Ormond,

"We both went through high school and college, didn't we, John?"

"Yes. But you learned something and I just went through."

"We used to think that the professors were severe and that at times they failed to pass men who might have slipped through had they had a little better than an even break."

"Yes; life at college was pretty hard at times."

"Well, we just did not know what it was to study. Graduation day here is somewhat different from what it was when we received our degrees, eh, John?"

Ormond never answered. He just stared in front of him, with a set hardened expression on his face. Sir Harry struck into the conversation.

"John, my lad, you must control your emotions. What we have seen is efficiency plus. I know lots of men with whom I went to the university, who should have been handled as these failures were this morning. I like the idea. Why should men live who are unable to make the grade and amount to something? These brainy dwarfs are teaching me a lot. I think that they are really admirable in many ways, and I am glad to be able to spend the rest of my life with them. I have always preached efficiency to my students. I would be false to the best in me if I did not appreciate to the fullest extent the wonderful system of life that these gentlemen have evolved through all the ages while we have been wasting, murdering each other to satisfy the cravings of our various emotions."

While he was talking a white-robed dwarf came in. He introduced himself, as these people all did, not by a personal name, but by the position that he occupied. The name of the individual was a thing of no importance; what really counted was the work that he did for the nation.

"I am the specialist in applied biology," the dwarf began in a very simple manner. "I have been asked to come and tell you something about the origin of life in our race. Applied biology, let me say, however, is very important to the national existence; for if any of us failed in our work of studying cells, their growth and deterioration, then the battle we have won against nature would be lost again, and the national life would slowly come to an end. The matter of replacements of worn tissue is very vital to the prolongation of our racial existence.

"A great many centuries ago, perhaps nearly forty thousand years, the then Directing Intelligence made the observation that not all women were satisfactory as sources of propagation. Some were sterile, others who were fertile and intelligent did not care to go through the ordeal of childbirth. In fact, the more intelligent our women were at that time, the fewer children they had, and, of course, as our aim was a constantly growing intelligence, we felt that we could not trust the future of the race in the hands of the children of the ignorant. At the present time I understand you Middle-Men are facing these very problems.

"In order to secure a proper viewpoint we began to study biologic problems and their solution through the older forms of life; the termite, ant, the bee and cockroach. We felt that, as their existence antedated ours by so many hundreds of thousands of years, they might have learned the solutions to the problems that confronted us. From a study of them, therefore, we evolved a scheme of perpetuating life that has become very satisfactory in every way.

"Each year we select from a group of five hundred mature young females twenty-five of special intelligence and other high hereditary qualities. These occupy the same relation to our biologic life that the queen bee holds in the hive. The skill of many generations of specialists in embryology, surgery, and internal secretions, has made our queens able to generate one egg a day, which is at once removed and placed in an incubator. These incubators are stationed on a carrying belt, which moves in an endless circle through our specially-heated and lighted nurseries. Over twenty thousand filled incubators, holding units, in every stage of development, are constantly passing along through the testing and sorting rooms. For the actual care, the feeding and the nuraing, we have specially built machines.

Mass Production

"THE final sorting is done by my pupil and myself. On us devolves the responsibility of removing those that show signs of being unfit; so that the standards of the nation will be constantly improved. When the sex is determined, most of the females are discarded. After birth, all the infant units are examined by our specialist in psychology and about half of those are disposed of. As the empty incubators are at once sterilized and prepared for more eggs, we have, in spite of the large percent of discards, an abundance of material for training purposes. The females are kept in their own cavern and are taken out only when they are discarded or to be placed in the queens' cave, which is adjacent to the incubator and nursery houses.

"As you have perhaps observed, for propagation we follow the efficient method of so many of the lower forms of life. However, our sexlessness is more apparent than real; a sexless person, by spe-

cial feeding and glandular medication, can be made into an efficient male in ten years. The only male who retains his sexual power is the Directing Intelligence. He is the father of all of us.

"The queens are watched carefully, and as soon as there is the slightest sign of deterioration in one she is discarded. By our system of inbreeding we have continued to raise the level of our mental life. The specialist in psychology tells me that the race as a whole has a mental power at least fifty percent greater than it was ten thousand years ago.

"The various caves under my direct care are in an inaccessible portion of Asia. We will go there eventually, but, for the present, I will show you various scenes from my department. Suppose you sit down in front of this screen? I believe you understand the working form, the different colored keys and the lever with the yellow handle. Now I will show you the queens' house. At present we only have fifty queens there. Our supply of intelligent females has not been very satisfactory lately. For two hundred years we have had difficulty in obtaining females of the best grade. They have no function except the production of ova. Their bodies are very small and their heads also are smaller than ours.

"This is a very uninteresting scene; so we will go on to another. Here we have a section of the incubator room. My assistant is at work, sorting out the weaklings and the surplus females. He is a very brilliant and tireless worker and already his judgment in regard to immature units is slightly better than mine is. You notice that he holds a lever in his right hand and carefully examines each immaturity as it slowly passes before him on the endless belt. When he finds a discard, he presses that lever, the incubator is taken off the belt, the contents discarded, the incubators sterilized and made ready for another egg.

"See! He has discarded one, a potential female. Now the incubator leaves the belt. It is taken to another belt by a machine worker, a door is opened and it is emptied by means of a vacuum cleaner into a tunnel which ends in a pit similar to the one you saw used so efficiently today. When we first started to use these disposal pits, we made them much smaller. Among others we had one in Russia and two in North America. We were experimenting in those days both in excavation and disposal methods. After we became more expert we turned subterranean rivers into these old holes. Lately we have been very much interested in the feeble efforts of the Middle-Men to explain the vertical walls and enormous depth of these holes.

"Of course, you understand that the disposal pits we use at the present time are simply the homes of different races of animals that have disappeared from the surface of the earth. We felt that science demanded that these animals and reptiles be preserved; so, we dug these enormous holes and are using them for game preserves. But they had to be fed; so, we fed them with the discards of our nation, and when these were not sufficient we would throw down thousands of Middle-Men. We tried feeding the beasts synthetic food, but they did not thrive; and we were rather concerned until we found that in our own discards we had a nearly sufficient amount of fresh meat for them. I believe though, that they prefer the bodies of Middle-Men to our discards. Perhaps the blood and taste is different.

"But just as soon as a growing unit, I believe you would call it a baby, is discarded, it is put into an inclined tunnel and shot down into a pit. Thus, nothing, not even our immaturities, is wasted. Now, if you will watch carefully, you will notice that my assistant is examining the first of a hundred incubators with units in them that are sufficiently aged to be started in nursery life.

"Perhaps of that hundred he will discard twenty-five. Notice how he does it? The door is opened so that he can obtain a good view of the mature unit. He is very careful. At times I have seen him spend five seconds in arriving at a single decision. Watch him——— Now he is through with twenty-three discards. The specimens that are passed are taken to the nursery for an intelligence test. We consider that they are now a day old. At once they are taught by radio-hypnosis. The units are gone over once a year and all who do not make satisfactory progress are discarded. At the age of twenty their general education is at an end and they are divided into two hundred groups, each of which is given an intensive education in one specialty. From these groups, as necessity arises, the new specialists are selected.

A Battle of Wits

"WE select our Directors from a specially-fed and prepared group. They have little responsibility but are excellent routine supervisors of our machinery. Practically all the finer work of our nation is done by specialized machines, I believe you call them robots. All that the directors do is to supervise these robots. Of course, there is a lot of work that is so hard and dirty that we do not care to construct delicate machines to perform it and here we use the Middle-Men we have taken as slaves. Naturally their life is short, that replacements must be made frequently; but so far, we have had no trouble in securing enough of the miserable things to supply our needs. We have perfected special machines to act as overseers, and we have but little trouble in training the slaves to perform routine tasks. You understand that it would be useless to ask them to do anything that required intelligence.

"We have no time limit for the life of the directors. They simply go on working till they become inefficient and then we replace them.

"Rarely the Directing Intelligence determines that it would be best that his office be filled by a younger unit, chosen by a competitive examination. No one need take it who does not wish to. Only the three co-ordinators and the two hundred specialists are eligible. On the appointed day the candidates face

the Directing Intelligence and are asked a number of questions. The candidate who passes the test most successfully is chosen as the rival of the Directing Intelligence. With the three co-ordinators as judges the two are tested and if the candidate worsts the Directing Intelligence, the latter places himself in the Lethal Chamber and the new director takes office. The new head of our nation is at once cared for by the specialists in diet and internal secretion, and as soon as he becomes a functioning male, he spends half a year in the queens' house. He returns there once every twenty-five days.

"This was the method originated many thousands of years ago. For the last three thousands of years it has been slightly modified. The displaced ruler lives long enough, one or two hundred years, to impart his special knowledge to his successor. He is not required to do this; but he may if he wishes to. The last four have kept on living.

"By this scientific method of renewing the units of our nation, we have been very successful in raising the standard of intelligence. We have found that life is a great deal more comfortable without the female sex. Our specialist in sociology has made a study of the relation of the sexes in the Middle-Men, and he reports that the females seem to be the cause of a great deal of trouble, by always making the males respond to the feminine emotions. Of course, we could not respond, because we are emotionless, but, at the same time, we have always felt that it was best to absolutely segregate the queens. Now I am very much interested in your opinion of this propagating method. How does it appeal to you?"

"It's almost perfect," was the Englishman's enthusiastic response. "Personally, I have never had anything to do with women; for I realized early in life, that the fact that the more man associates with women the more he is hindered in making a success in his specialty. Now you say that the quality of your units has been deteriorating—"

"Yes," the dwarf replied: "Our charts show that for eight hundred years there has been a steady increase in the number of units that must be rejected on the first examination. And even those that are retained have not the same qualities of intelligence, originality and adaptability as our standard prescribes. We have had a number of men at work on this problem for many years, and we believe that you will be able to throw some fresh light on the subject. It is becoming one of serious concern."

Suddenly the specialist ceased speaking and removed from the voluminous folds of his gown a little black box which he opened and on which he pushed a button. Then he held it close to his mouth and spoke a few words into it.

"The Directing Intelligence wishes us to repair to his room," he said to Sir Harry. The latter nodded and together with Wright and Ormond, followed the specialist out of the room.

When they were in the presence of the Directing Intelligence, he spoke to them. "Tomorrow I am going to take you on a trip to some of our more important caves. Most of them are natural caves, greatly enlarged by our machines. You Middle Men have no conception of the enormous size of the cave world under your feet. All of our caves are connected by tunnels, through which we travel by means of cars. These closely approximate the sides of the tunnel and are driven onward by atomic energy which we finally learned to harness and control. I would advise you to spend the night in sleep, because for the next two days we will be very busy. It is very important that you obtain a thorough idea of our plans. Now that you are to be a consultant in anthropology we want you to obtain our viewpoint of everything. Have you a clear account of our process of reproduction?"

"A very satisfactory one. Your biologist is a remarkably clever man."

"It is well that you met him. Had you come another time, a month later, you would have found him replaced by his pupil. That young man is learned, but has some peculiar ideas of his own importance. Do you know what I mean? Simply this. He hopes to become, some day, the Directing Intelligence of our nation."

"My word! What an ambition for a youngster to have. How crude of him to think that he could qualify!"

"Of course he has a right to if he can qualify. But the truth is that it is difficult to get enough candidates. For the last few hundred years there has been a growing disinclination among our members to accept responsibility. It's unprecedented. Now I will send for you in the morning. The coordinators will go into conference with me. We must replace our sociologist. He has been found wandering about our halls in a dazed fashion and insisted later on being permitted to enter the Lethal Chamber. He left no pupil and our decision will be a delicate one."

Once again the three earth men were back in their room. Ormond, as usual, was silent, almost moody. The Englishman looked at him out of one corner of his right eye. Wright walked over to the control table of the television screen and picked out the letters to form

THE QUEENS' CAVE.

He then pressed the red button. Immediately a picture of the room glowed increasingly distinct on the screen, till at last the women near the front were almost life-size. Wright looked at them carefully. Then he pressed the blue button. Not a sound was heard.

"These are peculiar women," commented the New Yorker. "Most peculiar. A room full of females and not one of them talking. But there is one thing about these women, Sir Harry. Look! They do not seem to be well. Something is wrong with them."

CHAPTER XII

More Captives

THE Englishman joined the New Yorker in his inspection of the picture.

"The only thing I can see is that they all have large necks."

"That is it; goitre, *hyperthyroidism* and *exopthalmos*. Bet they are in a limestone country. Singular their medical specialist did not see that. What's this? There come two women. Quick! Press the blue button."

And as two clean, fresh-looking young girls appeared on the screen their voices came distinctly.

"I do not care so much for myself, Joan, but I am worried about you."

"That is all right, old dear. Not your fault. Although you insisted on going on the walking trip into this forbidden land, I insisted on going with you; and then Aunt Charlotte insisted on going with us for a chaperone, and that is all there is to it. We were all determined to have our own way, so here we are. It's not your fault that we were captured by these monsters and put in this chamber of horrors. But what do you think happened to poor old Auntie?"

"That is what makes me sick, Antoinette. That little dwarf told us very distinctly that we were to be sent to the Queens' house for an experiment; but he did not say a word about the old lady. Can you imagine her drawing herself up and saying in her regal tones, 'I am Miss Charlotte Carter of Cartersville, Carter County, Virginia. I demand that you release me at once, also my two charges, or I shall report the matter at once to my senators at Washington, D. C.'"

"That was a long trip in that tunnel car, Joan. How far do you think we came and where do you think we are?"

"How can I tell? If this is the queens' house, I suppose these are the queens. Poor dears, how unhappy they look and how odd in every way!"

Wright pulled the lever with the yellow handle. Then he picked out on the machine,

MISS CHARLOTTE CARTER,

and pressed the red button. In no time appeared a picture of a small cave, with bars in front of it, and behind the bars a rather fine-looking white-haired woman in a walking suit. Wright pressed the blue button, and the woman spoke:

"Just wait till the President hears of this, and there will be a most distinctly unpleasant time for these scoundrels."

"My word, Wright! She's fuming," said Sir Harry.

"They're a hot-headed lot. Comes from one of those old Virginia families that knew Washington when he had to work for a living. A real aristocrat. Proud old lady, isn't she?"

"It seems so. One of the young ladies is her niece and the other a friend. Too bad they had to come across the border. My word! Too bad, but now they are here, they will have to take the consequences. What?" and he slowly winked at Wright. The New Yorker winked back and said,

"Let them suffer. Probably flappers, seeking new sensations. They may find them in that cave. Gee! I sure am tired. Let's go to bed. Come on, Ormond, go to bed and get some sleep. No use brooding because you'll never see any elephants down here. I will show you something worth shooting tomorrow."

The next morning the spokesman of the three coordinators came to their room, soon after they had finished breakfast:

"The Directing Intelligence is ready for the journey," he anounced: "Come with me. You need take nothing with you, as you will be back by night. We have been very busy conferring on matters of an interest to the nation, but the ruler feels that he must show the consultant everything as soon as possible; so, we are going to our large cave under the desert of Gobi at once."

In fifteen minutes they were seated in a small cigar-shaped car. The seats were double. In one pair sat the Directing Intelligence and Sir Harry; behind them sat the co-ordinator, and in the rear of the car were the nonentities, Wright and Ormond.

"This is one of our earth-circling cars," explained the co-ordinator. "You will not the directing mechanism in the front of the car. It is simply another keyboard. We spell the name of our destination and the car goes to that place, being guided by a radio beam. Of course, it has to stay in a tunnel, but there are hundreds of these tunnels; and the selection of the right ones to make a certain cave is a matter that can be done a great deal better by machinery and wireless waves than by even our intelligence. All I have to do is to pick out the letters GOBI, press this lever and we are off."

The tunnel car shot forward at what seemed to be a moderate speed. The explorers were astonished when the co-ordinator whispered to Brunton that they were going at the rate of five hundred miles an hour and would even approach double that speed during the journey.

A Remarkable Nation

"NO doubt you are interested in our source of power, not only for the tunnel cars but for all our machinery. First, how do Middle-Men obtain power? Usually they convert the energy of coal into electrical energy, by combustion. But they use only an infinitesimal portion of the energy the coal contains. Suppose you burn a ton of coal in pure oxygen? You obtain *5×10^{20} ergs of power. But we are able to take that same ton of coal and annihilate it, and, thus, we obtain *9×10^{24} ergs of power, or 18,000 million times as much power from the ton of coal as you obtain. For example, when you burn a ton of coal 99.999999994 per cent. of that ton remains useless in the form of smoke and ashes.

*50,[illegible]
**90,000,000,000,000,000 x ten billion.

When we annihilate coal, the combustion is so complete that nothing is left behind. If you knew the secret, you could send one of your ocean liners from Europe to America and back again with the expenditure of a piece of coal smaller than a pea. We do that. For example, when we place a tunnel car in commission, we put in the machine a piece of coal one-quarter inch in diameter. We pay no more attention to the question of power. Whenever the car moves, part of the energy is expended. After the car has traveled so many hundred thousand miles it is necessary to place another pellet of coal in the machines. Otherwise, it is purely automatic in its working. With such a source of power, the matter of speed is purely one of overcoming friction. That is a problem which we have not worked out up to the present time. Of course, we can go fast, probably more than a thousand miles an hour, though we find that such a speed is rarely advisable."

"Even at that rate it will take us some time to arrive at the Gobi cave," he continued: "At first you will think that cave disappointing, because, on casual examination, it is so similar to the cave at Reelfoot; but it is really very remarkable. In the first place, it is a natural crater over five miles in diameter. Thousands of years ago our nation began digging into its walls and now we have an underground city that could, if the emergency arose, accommodate the entire nation for an indefinite period. It is in this cave that we keep the queens, and here also we raise the young units till they are past the nursery stage of life.

"You will be interested in our art gallery. For the last fifty thousand years we have been painting a history of our race on the walls of the Gobi cave. Every hundred years our artists do a mural that is characteristic of the most remarkable feature of that century. We do not care for the emotional side of art, but rather for its historical and social values. For that reason we have slowly accumulated the paintings and sculpture also of your races. Of course, most of them are crude, but, at the same time, they are worth preserving as a matter of record."

"It must be a remarkable collection," exclaimed the anthropologist.

"It is. So many things would have been destroyed by your Middle-Men had it not been for us. Your wars have been destructive of the best that your dreamers have done. That library at Alexandria would have been completely burned by the Mohammedans, but we were able to arrive in time to save over half of it. When Constantinople was captured, we saved some of the best things in the city.

"And then we were careful, when we destroyed Atlantis, to save a great deal of the art treasures of that country."

"My word! You must pardon me," interjected the Englishman, "but did I hear you right? Did you say you destroyed Atlantis?"

"Yes. It was a remarkable nation. But they were beginning to know too much. They were so wise, so happy and prosperous and were making such rapid advances in every branch of learning that they had to be destroyed. We felt that if they continued at that rapid rate, they were apt to surpass us some day. We frequently destroy civilizations that annoy us. Sometimes we do this through our agents who obtain control of the countries by their superior intelligence."

At this point the Directing Intelligence slowly turned his body and head around till he was able to look at Brunton. Then he joined the conversation.

"We have given considerable thought to the civilizations of the present day. If it were necessary we could produce a war more terrible than that of 1914-1918. Of course, it is a tedious cumbersome method. Our bacteriologist is working on this problem now, and it may be that in a short time we shall be able when we wish to introduce diseases into the world that will complete the destruction of the Middle-Men in a short time. He is a very brilliant worker, and since he has started in experimentation on animals he has made rapid progress toward discovering the nature of life."

"So, you believe in vivisection?"

"Absolutely. It is the only scientific method. We have used many of our captives for experiments in breeding. Many of the women killed themselves, but we are more careful now. Would you like to see these laboratories?"

"I would indeed, sir. It would be a pleasure. The more I see of your nation, the greater my admiration is for your efficiency and your wholehearted determination to allow nothing to interfere with your progress. You have never known the meaning of the words failure or discouragement."

"I am not so sure of that," was the peculiar reply.

His reply seemed to put a complete end to the conversation. Hour after hour they shot on through the tube; but at last the car came to a stop. The doors were opened and they walked out into a well-lighted hall and from there to a larger room, where a gathering of specialists and their pupils were awaiting them.

CHAPTER XIII

Charlotte Carter of Cartersville

FORMAL greetings were exchanged and then the entire party seated themselves at a long table. The travelers from the cave at Reelfoot had had nothing to eat since breakfast and they were hungry. Food in abundance was placed before them. They were all hungry and it had been a long time since they had eaten. The food looked good, and had a fragrant odor that was more suggestive of flowers than vegetables. As they ate, they tried to identify the various dishes; but finally even the Englishman had to admit that all were absolutely new to him. Some days later they learned the reason for their gastronomic ignorance. All of the foods were synthetic, prepared in the laboratory. The flavor, different in every dish, was placed there to enable the dwarfs to eat more heart-

ily of the food. While bereft of emotion, they still retained their senses of taste and smell, and the dietetic specialists through long ages had evolved the idea of identifying various chemical compounds by different odors and thus make the process of eating a little less mechanical than it would have been otherwise.

The three earth men, during the time they ate their synthetic food, had to acknowledge that though they had sufficient nourishment for all their physical needs, they were never really satisfied. They were fifty thousand years behind the dwarfs, so far as their gastro-intestinal tracts were concerned; and, no matter how much they ate of the highly concentrated food, they still longed for the meat and vegetables of their former life.

In a short time the table was cleared, and the co-ordinator opened the meeting,

"The chief reason for this meeting is to introduce Harry Brunton to many of our specialists and induct him into his duties and privileges as consultant to the specialist in anthropology. He will have all the rights of the rest of the group, and have authority to carry on experiments and researches covered by his specialty. We will now ask him to remove his clothes entirely, so that we can clothe him in the robes of his profession."

Brunton had traveled all over the earth. He had been made a member and blood brother of more than one savage tribe. It can be said, however, to his credit that he passed through the uncovering of his body in public with a peculiar dignity that won the respect of all present. Shame was an emotion unknown to the underground race; but they knew that such an emotion existed among the earth people and they watched eagerly for its appearance in this noted stranger who had been selected by their Directing Intelligence to be one of their number till the time of his death.

A young dwarf now came forward with a white robe and assisted Brunton to drape it around his body, drawing the sash and tying it in a peculiar knot. Now the Directing Intelligence stood up and gave his charge in low, measured and emotionless tones.

"You, Harry Brunton, are now consultant to the Specialist in Anthropology for the people of Glow-wahr. In this position you will be given rights and powers inferior only to that of a specialist. You will at once select a pupil and bestow on him the wisdom that you possess in your special branch of intelligence. This pupil will be your guide. You are free to come and go as you wish throughout our realm. No door can be locked against you. But remember that for a long period you will be under the closest observation. We will stay here for a few hours to allow you to see some of our interesting caves and then our party will return to Reelfoot Cave. The meeting is at an end. All will leave except the new consultant."

The co-ordinator walked up to Wright and Ormond and commanded them to go with him.

"You need have no fear. Your master's position protects you. But you cannot stay here. Our ruler wishes privacy."

"Come and sit near me," said the Directing Intelligence to Brunton: "I want to talk to you about some private matter. You are to spend the rest of your life here and I realize that in many ways such a complete change in your habits will work a hardship on you. I want to make life here as pleasant as I can for you, so that you may work more efficiently. Were there more like you on the earth, we might be able to establish a reconciliation with your race. After talking over your future with the co-ordinators, I decided inasmuch as you are not yet unsexed, that you would desire a female to live with. So we decided to secure a Middle-Woman for you, one of your own age and, interested in anthropology and archæology. She will provide you with companionship, since you Middle-Men seem to have a need of it. She was a professor in these subjects at an American college for Women and was one of a party of three women we picked up walking through Kentucky. We do not know very much about the feminine mind; as you know, our females are simply producers of ova. But I suppose you can handle this one. Our specialist in machinery will make you a robot servant that can tame her till she is willing to submit to your authority. Her name is Miss Charlotte Carter, and I will now have her brought in."

In a few minutes the lady from Cartersville, Carter County, Virginia, walked in. She lost no time in making her demands:

"If you men are the rulers of this savage country, you will at once order my release and also that of the two young ladies of whom I am in charge: Miss Joan Summers and my niece, Miss Antoinette Carter. Our abduction was a most shameful affair, and will call for the most severe reprisals as soon as Washington is notified of it."

The Directing Intelligence turned to the Englishman eagerly.

"You will have to explain matters to her. She is your female and you will have to handle her."

"My word! Awkward position, Madam."

"I am not a madam. I am a Miss."

"My error. Pardon. You make me feel like wilted lettuce. But to business at once. This gentleman is the Directing Intelligence of a race of super-beings who are called the Ruling Minds of Glow-wahr; but on the earth they are known as the 'Conquerors'. You may have heard of them. I am Harry Brunton and I have been given the honor of being made consultant to their specialist in anthropology. I will probably remain here the rest of my life. Without consulting me, they decided to provide me with a female and for that distinctive purpose you have been brought here, from America, to the Gobi cave in the heart of Asia. You are here, and you cannot return. So you had better make the best of it. Lots of things could happen to you down here worse than living with me. We are both interested in anthropology; thus we shall have a great deal in common. I think that you had better be

nice about it. My friends down here are not very familiar with ladies of the earth and they might not treat you very well."

The Virginian lady walked up to the Englishman.

"If you were the last man on earth, I wouldn't marry you!" she cried.

"My word! No one said anything about marriage," exclaimed Brunton.

He turned to the Directing Intelligence.

"She cannot think. Reasoning is impossible for her. Marriage! My word! And I have refused a dozen of the prettiest heiresses in Europe! I'll tame her. My word! Or shoot her down to the bone makers. Talk to me about marriage! Have her taken out and washed and a white robe put on her and we will take her back to my apartments at Reelfoot. Send her out at once."

"If you want to, we will send her to the Experimental Laboratory," said the ruler: "We thought you would want one of your own age. We will get you any kind of a woman you want."

"This one will do. But get her out at once!"

As though in anticipation of his desires two dwarfs came into the room, took the woman by the arms and led her out. The Directing Intelligence raised his hands and supported his head on either side with them:

"I have a peculiar feeling in my head. Five hundred years ago I could have faced any problem without difficulty. I could go for days without sleep. Now it is different. Perhaps this is the end. You heard what happened to our sociologist. This seems to be but one of many peculiar happenings. The biologist tells the co-ordinators that the queens are not well and that the new units are of a very poor quality. The time may be ripe for the selection of a new Directing Intelligence. Of course, this is confidential; whenever we change leaders, there is always a period of uncertainty and unrest. Perhaps we have too many Middle-Men working for us. They are always hard to handle. Perhaps the machine overseers are too severe. That happened once before, and most of our Middle-Men were killed before we changed the machines to a less powerful voltage. A great many of the workers are suicides. It is becoming more difficult to secure material for our diffuse labor. Naturally our machines do a great deal; but there are some types of work that we have never been able to build machinery for. I am also bothered about our slaves; I want to dispose of them in some way. I want you to give it some thought."

The Zoological Gardens

AS though in obedience to an unspoken request, the co-ordinator returned to the room, bringing with him Wright and Ormond. They were told to sit down. The Directing Intelligence turned to the co-ordinator.

"I want you to talk to them, and then take the three of them out and show them the Zoological Gardens."

"The ruler of our nation directs me to explain some parts of our work to you," the co-ordinator said: "Many thousands of years ago when we realized how far we were above the Middle-Men of our age, we also saw how impossible it was for them to preserve their national entity under the conditions of hardship and constant war and famine that they were exposed to. We saw also that many of the animals of that period were doomed to extinction unless they were protected in some way. For these reasons we started, long ago, making a collection of animals and races of men which we saw were becoming extinct. We have a name for this in our language, but you can call it by a name familiar to you, zoological garden. It was an easy thing to do. We simply prepared large pits, holes in the earth, somewhat similar to the one at Reelfoot Lake. In each pit we placed a distinct form of life and tried to make the pit as close to its natural conditions of life as we could. For example, the mammoth herd is placed in a pit high up in the Himalayas, where it is just cold enough for them to be comfortable and, at the same time where there is a warm area to grow their food. We watch the herd carefully and remove all superfluous males. Thus we have still twenty mammoths, exactly the number that we started with.

"All of the reptiles and animals and birds representative species that are at present extinct on the earth's surface. Some have only recently become so. Among the animals we class the original native of Tasmania. Of course, he is a variety of Homo; but never able to advance much above the lower Palaeolithic culture. He was not a Neanderthal man, only a little better. When the Dutch discovered this island in the year 1642 of your chronology, there were about five thousand of this race. In 1831 there were only two hundred and three. Then we took a hand. Over thirty of the youngest and strongest were removed by us from Flinder's Island. The English thought that the inhabitants were dying fast; but that was simply the result of our taking the best breeders. In 1876 the last Tasmanian died and the race was believed by you to have been exterminated; but, in reality, there are fifty-seven left in our Zoological gardens, where we have imitated fairly well their original surroundings.

"We have done this with other peoples. The Australian aborigines are doing fairly well. They are uninteresting to study, but were being killed off so rapidly that we considered it worth while to give them a home in our gardens. You can see these peoples some day. In fact, your special province will be their study.

"But these are simply sidelines of our most interesting work. Fully thirty-five thousand years ago we saw the necessity of preserving races that were bound to become extinct. In an isolated portion of Greenland we made a home for the Cro-Magnards. They are doing very well there and seem to be slowly developing mentally. They are fond of reindeer meat and have had no difficulty in adjusting themselves to the climatic conditions.

With them, we have been able to keep alive the ibex, primitive horse, cave bear and bison. You Middle-Men feel that you know something of the reindeer men from your study of the caves at Altemira, Aurignac and La Magdaleine; what do you think of being actually able to study the living people of the Aurignacian or Solutrian Ages?

"In Switzerland, surrounded by almost inaccessible mountains, we placed a colony of Lake Dwellers. They were fine examples of Neolithic culture but were bound to be destroyed by higher types. We took an entire colony from one of the Swiss lakes twelve thousand years ago and placed it where it could not be destroyed; and they are doing very well, indeed.

"Without going into too great detail, that is the plan that we have followed all these centuries. When, for any reason, we saw fit to destroy a race, we preserved a fragment of it, perhaps fifty persons, just enough to enable them to continue their existence. We made it possible for them to go on living the lives that they had become accustomed to. In not a single instance have we interfered with their culture. All we wanted was to have them keep on living as they have. If you place bears in a cave forest, you do not expect them to develop the habit of wearing clothing, do you? Similarly we do not want the reindeer men to learn the use of bronze or develop the art of weaving, pottery or agriculture. Do I make this clear?

"So, you will find in different parts of the world, and many of them right here in our Gobi cave system, relics of the dim past, isolated from each other and from the world at large, living in our zoological gardens, our anthropological living museum. You Middle-Men pride yourselves on making a model of a Neolithic family and placing it in a glass case. How much more remarkable it is to have the actual representatives of dead races.

"We will show you a colony of Tyrians; another little group of Carthaginians. Two thousand years before Christ, in your reckoning, we took fifty representative citizens from the city of Cnossos on the island of Crete. They are living now as they did then. We even have a colony of Romans, proud, haughty creatures, who are waiting for another message from their Mother City. When Alexander the Great took his Macedonians into Asia, we were able to isolate fifty of his soldiers in a crater in Afghanistan. We took Grecian women to them, and they are now one hundred and seventy in number. That is the way we have cared for these ancient peoples. There are perhaps seventy colonies in all, and it will be your province to visit them and study them and care for them. We do not want them neglected in any way. The ordinary Middle-Men we consider as so many animals, to use as we wish and kill when we are through with them; but these colonies are our pride. We feel a definite responsibility in regard to them. I do not say that we admire any of them. Their culture is so far below ours that we feel they are almost another race. They perhaps look up to us as gods, as you would say."

An Introduction

"WE have preserved a colony of ancient Britons, and another of the old Norsemen. Most of the races since the present Directing Intelligence assumed control have been uninteresting to us. We felt that we could not be cluttered up with trash.

"However, we are much interested in the modern citizen of the United States; I refer now to the city dweller. The Directing Intelligence feels that in his mode of life and surroundings he is unique. He asked one of the specialists to make a study of their habits and the architect has been doing some work in study and reproducing their buildings. We have now ready an apartment house that will hold fifty couples. It is really a very remarkable duplication of a modern one-room-apartment building in New York City. We have placed it in a new hole three miles in diameter. Suppose we take an air machine and visit it?"

Without further invitation he walked out of the room, followed by Brunton and the two New Yorkers. After a short walk they came out on a landing where the flyer awaited them. The only resemblance that it bore to the airplane of the Middle-Men of 1930 was the fact that both traveled in the air. Going into the cabin, the co-ordinator waited for the others to follow him, shut the door, touched several buttons—and away they went up in the air. Then followed an exciting flight over the Gobi desert and finally a gradual descent into a large hole. Here they stepped out of the car.

"I think that we had better get into an automobile at once. We have a garage here, well supplied with *Speedwells*. It seemed that nothing less than a seventy-mile-an-hour car would satisfy. I suppose you Middle-Men can drive?"

"I can drive anything," boasted Ormond.

"Very well. Get into a car and drive us around this circular track. Drive slowly, for I want to explain matters to you as we go. You see that here we are in the center of what might be called a miniature New York. We have a miniature moving-picture theater, a department store for the women to shop in, a delicatessen store and a self-service cafeteria for those who wish to dine out. There is no use of going into the apartment house. It is similar to thousands that you saw every day in New York. On the other side of the hole is a small office building. You see, we have everything provided for. The women spend the day shopping while the men are at the office. At night they meet and either get their supper at the cafeteria or take it with them in paper bags from the delicatessen store to eat in their apartment. After supper they go driving or visit the movies. Suppose we drive around the circular road? Nothing can be seen except advertising sign boards. We made a special study of signboards and I am sure that you will be pleased with them. Look at that one!

CHEW CHERRY GUM

KEEP

JERKING JAWS JAZZING

"Every half mile we have a filling station and at frequent intervals a hot-dog stand. Here and there we have planted violets, dogwood and wild azalea. We expect these to be rapidly torn up by the motorists and replaced by empty tincans, waste paper and trash of all kinds, but we will replace the wild flowers every year. I think that you will enjoy riding around this circular track. You can go as fast as you want to and you will always be going somewhere and, at the same time, you will always be going back to the city.

"The question of noise bothered us. We felt that fifty men and women could hardly be expected to make a satisfactory amount, even though each apartment has a radio and an automobile. So, we have placed a hundred noise machines in different parts of the hole. One button turns them all on. And when they are all on, you New Yorkers are going to feel at home.

"Among other things will be this interesting feature; a part of the street will always be torn up. We felt that a finished New York would not be home at all. Also, right across the street from the apartment house, is another apartment house. This will always be in the act of being torn down or built. You will always live within the sound of a steel riveter.

"We do not intend to make any change in your social life. That is for you to arrange. We are going to start with fifty men of a high type, and their wives, in the apartment house and probably a hundred of the servant class in a tenement house at the other end of the street. You can divorce yourselves and remarry as often as you wish. There is only one stipulation, and that is that you must keep up the number of the colony by an appropriate number of childbirths.

"And now I am going to ask the consultant in anthropology what he thinks of such a colony for the purpose of preserving the culture and refinement of the highest type of American citizenship?"

"I have no words to express my approval," replied Brunton: "I stayed for over two weeks in New York, and I feel that you have left little undone for the comfort of the average member of that community."

"It is well that it meets with your approval, for it concerns you rather deeply. We do not want your servants, Wright and Ormond, to be at large; in a way, we do not trust them. They are not worthy of adoption into our race as we have done with you; we hate to place them with our degenerate workers and we were really at a loss as to their disposal. The thought came to us that we could place them in this colony."

CHAPTER XIV

Introductions

EVEN as he spoke another air machine came down from the skies, and landed near them. The door of the cabin opened and out stepped two women. The pilot remained inside.

"Come over here," comanded the co-ordinator: "Gentlemen, I want you to meet Miss Joan Summers and Miss Antoinette Carter. Both are of the blonde type which we find are so popular at present. They are both accustomed to New York life, having spent the last seven winters there. Ladies, I want to introduce you to Sir Harry Brunton, late of England, but now of our nation. He will do all that can to see that your stay here is a pleasant one. The other two gentlemen are from New York, and are both single. This is Mallory Wright, and this is John Ormond."

The two girls stared at the co-ordinator, but at last recovered themselves and acknowledged the introduction.

"Can you tell us the purpose of all this, Sir Harry Brunton, and just what has happened to our aunt?" asked Miss Summers.

"My word, yes! Awkward to tell you, but your aunt is going to live with me. Wife, no doubt. You ladies are to marry these two New Yorkers and live right here with forty-eight other couples. I do not know which will marry which, but you will have lots of time to decide that, and, if you find you have made a mistake, you can change later on."

Miss Summers looked puzzled:

"I never heard of such a thing! These men look like nice chaps, but we don't want to marry them, and I am sure that my aunt does not want to marry you or anyone else. Did she say that she would? Have you seen her?"

"I certainly have. She told me that if I was the last man on earth she would not marry me; but I think she will have to change her mind."

"What did you tell her?"

"I told her that she will be fortunate to have a chance to marry me, but that she is going to stay with me anyway. She was very much upset over it, but she will cool down when she thinks it over."

"I wonder what the United States government will think about this?" asked Miss Antoinette Carter.

"That is immaterial," the co-ordinator replied, "for in a few years there will be no United States, therefore, no government. Consultant, what do you want to do with these four persons?"

"I think they had better go back with us to the Reelfoot Lake cave. I am going to take their aunt there, and the six of us can live together and get acquainted with each other. You are not ready as yet to open this New York colony. There are some finishing touches to do and the servants have to be secured. Ladies, you will come with me; your aunt will be with us. You will find all of us gentlemen, and I am sure that your life will be much more pleasant if you act nicely than if you resist."

"We are not going to go with you!" cried Miss Carter.

"I think you will! Co-ordinator! I understand that the human experimental laboratories are in this Gobi cave. Take us there. I want these young ladies to see what happens to other women not as fortunate as they are."

"Wait a minute!" demanded Miss Summers: "Tell us about it. What do you mean?"

"Simply this. These people are always experimenting with diseases and germs. They perform these experiments on human beings, men and women like we are. They keep them in wire cages, like so many white rats, and they do as they wish to with them, as we do with rats and monkeys, and when they are done they open their bodies and study them and then throw them away. That is what might have been our lot. They take women and breed them for experimental purposes. And the odds and ends they use as mere slaves, to do the hard work that they do not wish their sensitive delicate machinery to do. When they are worn out they feed them to wild animals. That might have been your lot. Instead, you are given the opportunity to marry two very nice fellows and live in a new apartment house with servants, automobiles, stores and restaurants at your command. Why not look at this matter in a sensible way! Your aunt and I will come and week-end with you."

"But it is all so new," whimpered Miss Carter.

"Life is that way. My word! I never thought that I would be a trusted unit in this nation of Conquerors. I have learned more new things in the last week than I ever did in the whole rest of my life. It is interesting. You may feel that it is hard to be taken out of your old life; but you will find much to admire in the new life. Give these young men a chance and you will like them. This colony will not be ready for occupancy for some time, and, till then, you are to be my guests. Wright, can't you say something? My word! I thought you New Yorkers were proud of calling yourselves fast workers."

"It is all very embarrassing," murmured the New Yorker.

"What does he mean by that word?" asked the co-ordinator.

"It is an emotion. I thought that no real New Yorker was ever embarrassed, but it seems that I am not correct. Suppose we go back to the Directing Intelligence? Or is he through with us?"

"He wants to see you for a minute, Consultant, and then he thinks you had all better go back to Reelfoot."

"Then let us all get into the airplane. I think we shall be able to go in the same plane. It will be more *en famille*. How clever I become. I hope that it will last when we again see Miss Charlotte Carter. My word! She made me feel like wilted lettuce."

A Heart to Heart Talk

ONCE again Sir Harry was alone with the Directing Intelligence.

"I am not going back to Reelfoot with you," the ruler said: "I have been informed of your activities since you left me to look over our new colony, the miniature New York, and I think that you are wise to take the three women back with you for a little while till the colony is ready for occupancy. There are some matters which I wish to explain to you. A few of the details are known only to the three co-ordinators and myself, but we thought you should be told about our future program.

"You have seen our colonies in what we call a living anthropological museum. I want to say that we have done our best to make these colonies self-supporting and perpetuating. Unless something happens which we have not been able to foresee, the Norsemen, the Tasmanians, the Carthaginians will still be in existence ten thousand years from now. Each preserves a splendid isolation from all the others. They live in little worlds of their own between which communication is impossible.

"The inventive mind of the present human race will spoil all this if allowed to follow its present trend. The average scientist of today among the Middle-Men is fond of prying into the waste places of the earth. Only by constant attention to details have we been able so far to prevent him from discovering our colonies or, for that matter, ourselves.

"The development of our anthropological colonies has been the most interesting thing in our racial existence. We have been fond of playing guardian to the lower races of the *Genus Homo*. It is true we have deliberately destroyed entire nations; but always we have saved enough to make a colony and thus preserve their culture for future study. I am afraid that as a nation we are becoming decadent. We have not enough aim and ambition left to give us stimulating mental exercise. Perhaps as a race we are reaching our senility. I have entertained doubts, at times, as to the wisdom of our system of reproduction.

"For some time we have been annoyed by the Middle-Men. That is, they have constantly interfered with our work. What is our work at present? Just this. We have done all we can on this planet. We wish to leave it and explore other worlds. We will come back to this earth as a base; but we will add to our activities by conquering space and whatever forms of life we find there. At present we are making machines for interplanetary travel. That was one reason why we wanted the undisturbed possession of a part of the United States.

"When our plans are completed and our machines perfected, we will close our caves here on earth, oil and otherwise protect our robots from rust, kill all the earth-slaves that we have in our caves, make final provisions for the comfort of our colonies and zoological gardens, and then send on the earth a plague that will, inside a month, wipe out the human race, except those men and women who are

kept as specimens. Only by doing this can we preserve the secret of our colonies.

"I think that it is a good plan to destroy the Middle-Men. They have not measured up to what we expected of them. Two hundred years ago we took selected specimens and sent them ideas and since then they have gone rapidly into a mechanical and electric age; but they have not made much use of their advantages. We feel that the time has come to destroy them. But, following our custom, we will, in as complete a manner as possible, preserve their so-called culture in our latest colony; one hundred men and women of the higher class and an adequate number of servants. At the proper time we will scatter the death germs over the earth from our air machines, enter our interplanetary machines and seek other intellectual diversions. You will come with us?"

"My word! Stupendous!! The more I see of your race, the more I admire your intellectual attainments. I am proud to be one of you. But there are still some things that I do not understand; your large hands, when you do no work? Your language and your perfect ability to speak in our language? And your remarkable control of your units?"

"All proper questions, and showing that you are far ahead of the average Middle-Man. Our hands had to develop. For long centuries we used our hands a great deal; for we learned that there was a direct connection between the movement of our hands and the development of the brain. Naturally there came a time when our robots were so efficient that it was no longer necessary to employ manual labor; so, the muscles have grown flabby, but the size of the hands has remained.

"Our speech is different. It is really thought, which, as you know, is not dependent upon sound. Thus we could communicate, if we wished to do so, with three men in three different languages, and be perfectly understood by each, using only one series of thoughts. That is all very complicated, and I am not at all sure that it is necessary for you to understand it at this time.

"As for our government, it is the most perfect absolutism that has ever been developed on this earth. You Middle-Men have never seen anything like it. Each individual has his own sphere of action in which he is supreme; but for over eighty thousand years, and perhaps more, no unit has dared to dispute any matter with the Directing Intelligence. Of course, I confer with the three co-ordinators: but even they yield absolutely to my final decisions. For example, I could order the entire nation to enter the Lethal Chamber, and they would go at once without hesitation. Now, is there anything else that I can explain to you?"

The Directing Intelligence Explains

"THERE is. I am interested in these Middle-Men that you have here. Do they never revolt, attempt to destroy you, in search of their freedom? What is their mental condition?"

"Revolt is not unknown to us. Ten thousand years ago we had to kill most of them and start over again. The replacements are very numerous. Some live for five years, but many are good workers for only a few months. We thought that, if we had as many women as men, they might be more contented with their existence, but it made only more trouble. The women wore out too fast. The men killed each other, fighting over the women. A century ago we started a new plan. As soon as a Middle-Man or woman is brought down here, he or she is operated on and made sexless. As neutrals, they work better and last longer. Lately we have been experimenting with mental diseases and have inoculated all of the Middle-Men with the germ of dementia praecox. When this disease develops, they make very good workers and become quite strong and fat."

"How many of them would be able to resume their earth life if they were returned?"

"Practically none. Even with those who have been well cared for in the cages of our experimental laboratory, there would be an inability to readjust themselves to a surface life. Let me show you why. For centuries we have been trying biological experiments to make a new race of workers. I suppose we have used five thousand women of different nationalities in these experiments. At present there are three hundred white females in our biological laboratories. Naturally, they would rather die than return to their families."

"My word! Yes. As usual, you are right. They are all better off dead. I suppose that when you kill the rest you will also empty the cages in your laboratories?"

"Yes, they will all be emptied and thoroughly cleaned and sterilized, to make ready for any new specimens that we bring back from other worlds."

"Your whole idea is wonderful!" exclaimed Sir Harry: "I feel that in making your decisions you have always acted for the best interests of the race. When will you start on your interplanetary trip?"

"Soon. The preparations are nearly completed. Our space machines are examples of mechanical perfection. Trial flights in them have shown the soundness of the engineering details. The same force will be used that is used to drive our tunnel cars, the complete annihilation of small pellets of coal. There is only one factor in our national life that is causing us concern; and, till that detail is solved, we cannot hope to make a success of our interplanetary conquests."

"As a member of the nation, vitally interested in its welfare, may I ask just what it is that disturbs you?"

"You may, and I am going to be perfectly frank in answering you. For centuries there has been a constant increase in our intelligence and efficiency. We have probably attained to the apex of possible mental growth. As leaders in every branch of scientific research we feel that not for millions of years will a similarly-gifted nation be developed in this world. But, for over fifteen centuries, there

has been a gradually increasing apathy, a disinclination to progress as individuals. The specialists seem to be willing to remain in their positions. When a co-ordinator or a Ruling Intelligence feels that the time has come for replacement, it is almost impossible to find anyone who is willing to become a candidate for the position. The situation is especially trying in regard to the Directing Intelligence. As you know, he is the father of the race. There has come the thought that, due to constant intermarriage and an absence of new blood, perhaps the nation has become decadent.

"The study of the history of the various nations of Middle-Men shows that the average nation lives about fourteen hundred years. The lives of your nations consist of birth, an adolescence, a maturity and a period of decay, followed by death. We felt that our nation, composed as it was of individuals who would never die were it not for the best interests of the country, might live on forever. But now enters this strange psychic apathy, this unwillingness to assume greater responsibilities, a contentment with life as it is. How can it be explained?"

"Pride is one of the emotions you have deprived yourselves of."

"I understand that. But this situation is not to be explained by the absence of the emotion of pride. Take the case of the specialist who was found wandering around our halls in a dazed condition, muttering over and over that he wanted to be led to the Lethal Chamber. There was a case of some form of acute mental disease, and I fear that this same condition exists in a chronic condition among most of our specialists. Our psychiatrists have studied a few of the worst examples and feel that, unless we can be confident of correcting this part of our mental life it would be best not to go ahead with our space explorations. Of course, we will follow out the program as far as the destruction of the Middle-Men is concerned."

Sir Harry rubbed the back of his head thoughtfully.

"I have done a lot of exploring in Australia," he at last said, "and I met an isolated tribe of Bushmen there who presented some very interesting problems for study. I lived with them nearly a year, finally being able to understand their language well enough to follow their thought. They had been completely isolated from all other tribes for so many centuries that every child was the product of the most intensive inbreeding. The entire tribe was related to each other. Their decay was so fast that they have already died out. The remarkable part of their existence was the fact that they did not seem to care what happened. My word! They were absolutely uninterested in the things that make life interesting to most of us. I tried to show them better ways of doing things and they showed an absolute lack of interest. They were without emotion and without incentives. By jove! It occurs to me that those Bushmen had something in common with your nation. There is certainly a psychic resemblance. Perhaps I could, with Wright to help me, do something—but, perhaps, after all this is not time to mention such a possibility."

"I suppose you mean that you could help us?"

"Something like that."

"Perhaps that is what made us bring you here?"

"That might be. But suppose you were able to make this trip into space, explore other worlds besides ours? You still feel that it would be necessary to destroy the Middle-Men?"

"I believe so. They seem so useless and so inefficient. And we may wish to return and take possession of the entire earth."

The Englishman sighed:

"If that is all that you want to talk about, I will ask you to excuse me. This has been a hard day for me, and I think that it would be best to return to our apartments at Reelfoot Lake."

"You have my permission to depart. Think about that psychic apathy and see what can be done about it. Come and see me at any time and do not hesitate to call on any of the specialists for help of any kind."

CHAPTER XV

Hopelessness

THE new consultant was leaving the room when the Directing Intelligence called him back.

"I wish you would give the matter of headaches a little thought. My cerebral pains are becoming almost disabling at times. Long ago I would have allowed myself to be replaced had there been any candidates. I wish you could help me in some way."

The Englishman promised to do his best.

The journey back to the Reelfoot Lake cave was a silent one.

Sir Harry Brunton looked old; in his white robe, any other man might have looked like senility returning from the bathroom. He seemed more like a Roman senator, deliberating with sorrow on the debilities of the new generation. He leaned back in his seat, folded his arms and shut his eyes. In that position he remained till the tunnel car came to a stop at Reelfoot.

Miss Charlotte Carter was equally silent. She had gone through a very trying ordeal. In spite of her protests she had been bathed and almost disinfected. When it was finished, she was forced to admit to herself that she had never been so clean in her entire life. After this she was clad in a single white robe which reached to her ankles. It was warm, but, even to her old-fashioned ideas, absolutely without style. If she were to be forced to live with a mad Englishman, she thought they might at least have let her have some say as to the kind of clothes that she wore. She just knew that she looked a perfect fright; and no wonder that her nieces had almost snickered when they first saw her!

The two girls, however, had other things to think of. They had not only been captured, they were

being threatened with life in an insane asylum, called a "New York miniature colony," the wives of two New Yorkers, who also had been captured. The whole arrangement seemed like a dream. And the worst part of it was that the two men were evidently as opposed to the marriage as the women were. No courtesies had been exchanged since the introduction. The girls thought that the boys might at least be civil.

The two men were not to blame. Their past life in New York had been but a poor preparation for the adventures that they had been through since they had left the metropolis. The most depressing part was a constantly-growing despair. They realized that their captors were indeed "Conquerors." Whatever these strange people planned, they accomplished. All that they had to do was to issue an order and it was carried out. Human life, the happiness of men and women, the desires of the individual, meant nothing to them. Their only thought was the welfare of the race. Selfish? Yes, so far as the nation was concerned; but not a bit so in regard to the unit.

The two New Yorkers felt doomed. They were not native born, but they had lived in New York long enough to love the city in spite of its defects. They felt that the model was a pitiless caricature of everything that was bad and useless in the metropolitan life. Surely all of New York was not like that. And the Conquerors intended to display the colony to future generations as a living picture of the culture, refinement and intelligence of the average man and woman of 1930. It was not fair. There was no justice.

And Wright determined that he would show them. They had made a city for a hundred persons of the better classes, and in a tenement house they were going to put a hundred or more servants. He was going to be mayor of that city and then he would show them! Those silly signs were going to come down and be used for firewood. The wild flowers would be cultivated and the whole pit made into a gorgeous, beautiful, natural park. There would be an end to the hot-dog stands, and the cooking should all be done in the homes by the women.

If they had to stay there, he would make it a model town. Just as soon as he could, he and Ormond and the two women would select their companions. He would have Brunton give the list to the co-ordinator. Of course, the drafted individuals would feel sore at being made to come, but it would be easy to show them that only by doing so was it possible for them to keep on living at all. It was better to live in a little colony than to be dead in a large cemetery or to be eaten by animals that might be at the bottom of the hole at Reelfoot.

Ormond sat moodily, his chin pressed down on his collar, and now and then swore softly to himself. Taking everything into consideration, it was not a very merry party.

Mutual Sacrifice

AT last they were back in the rooms which Sir Harry Brunton had called his apartment. Miss Charlotte Carter had done a lot of hard thinking and had made up her mind to open the conversational game. They were no sooner in the main room, the co-ordinator gone and the six of them alone than she began:

"I have a proposition to make to you, Mr. Brunton, or Sir Harry, or whatever you call yourself. These girls are my nieces, one by blood and the other by adoption. I am responsible for their being in this trouble. Of course, they started the trip, but I should have been firm with them and made them behave themselves. Frankly, I was curious to find out just what the country looked like after the mist left it. I found out.

"I want to make a bargain with you. I will stay here with you. That does not mean that I like you any more than I did yesterday; it does not mean anything. It simply shows you that I won't be fighting all the time. It does not make any odds to me whether you marry me or not. I think that, if I have to spend my life down here with these monstrosities and wear this kind of clothing, nothing that happens to me will make any difference. But I promise you that I will be as nice to you as I can, if only you will let these poor girls go back to their parents and the sweet sunshiny earth again. Will you?"

The young women rushed to her and started to kiss her.

"You sweet thing!" Miss Summers cried: "Do you think we would let you make that kind of a sacrifice for us? Not at all! I was just going to make the same proposition. We girls will stay with these two men and help them start their silly old colony if only they set you free. I suppose Sir Harry is a nice enough man; but at your age——"

But the aunt interrupted her:

"My dear child! Why do you say at my age? Please remember that I am the youngest of my family, and, in spite of the fact that my hair is white, I am only ten years older than you are. No! If anyone makes the sacrifice it must be me. I think this man is going to be a gentleman, even if he does look like a fool in that bathrobe."

At that Miss Antoinette Carter started to laugh and then cry. It was too much for Ormond. He had sisters at home. Awkwardly, he put his hand on the girl's shoulder.

"Don't do that, Miss Carter, please don't. It is bad enough as it is for all of us without breaking down. We are going to do everything we can for you and the other ladies; though just what we can do is a question. Don't mind our friend and the way he talks. He has a very important position with the new government and, of course, he has to do what is expected of him."

When Mallory found how nicely his friend was taking care of an awkward situation and a beautiful girl, he lost no time in trying to be equally cour-

teous to Miss Joan Summers. Sir Harry looked on in silence. At last he started to grin:

"It seems to me, Miss Carter, that perhaps your proposed sacrifice for your nieces would not be appreciated."

And even the former professor of anthropology was forced to admit to herself that worse things might have happened to the girls than to be made to marry these two men and live in a colony.

But the Englishman had some things to say to his companions; so he lost no time in asking them to sit as close together as they could and listen to him. The girls were feeling much better by this time and had even found that they knew some people in New York whom the two younger men knew, and had seen a good many of the same shows.

"My word! but this is an odd situation to be in," began Sir Harry, "and I am not sure that I shall be able to make myself understood; but here's trying. We are all here together in the same boat. We may think that we are in tough luck; but our situation is Paradise compared with the poor men and women who are down here as slaves. I don't know how many of them there are, but they are just so many cur dogs, as far as the Conquerors are concerned. All of us might have been that way, except that we have drawn a better hand of cards in the game of life.

"As you know, I am one of the race; I am what you might call a Conqueror myself. I had nothing to do with Miss Charlotte Carter's being brought here, and I was as much surprised as she was when I found out just why they did it. I have never married; I never found a lady who would look at me twice; so, I have spent my time just wandering. I have money, but I never had a real home. My parents died when I was young and after that I had neither kith nor kin.

"It looks as though I were going to stay here. If Miss Carter wants to stay with me as a fellow scientist, I promise her that she will be treated with the greatest respect. In England I was known as a man and here I am the first Middle-Man to be given the rights of a Conqueror. I do not say this boastfully, but I want Miss Carter to know that I have been considered a gentleman all my life. She will find me one.

"Now in regard to these young people. Their condition might be worse than it is. Unless something unexpected happens the Middle-Men in the New York Colony will be the only members of our race alive. In that colony they will lead the lives of pampered pets. The Conquerors will do all that they can to make the life of that colony secure and successful. So far as I can see, they have neglected nothing.

"I am going to keep you five people right here with me for a while. Things may happen in the future that may seem odd, but always remember that I have your interests at heart. I would like to do something for the slaves; but their doom is sealed. Now, how about a jolly six-handed game of poker; or would you rather play bridge, while I tell your aunt about the colony of Tasmanians?"

A Game of Poker

THE next morning, immediately after breakfast, Sir Harry took Mallory Wright to one side,

"Listen, my lad. I brought you along to have the services of a true scientist if the need for one arose. Well, to make short work of a long subject, let me say that there is something for us to do. I think that you and I have it in our power to do something rather fine, if only we can put it across. Did you ever do any bio-chemistry?"

"A little, working with serums and antitoxins."

"You are at home in a chemical laboratory?"

"Yes, I think so."

"Then, we will get busy. There is no doubt that these people have the laboratory and everything in it that is necessary for our work so, there need be no delay on that score. Suppose we tell Ormond to entertain the ladies? We will put in some hard work in experimentation. Perhaps some of it will be difficult, and, personally, I shall have to leave most of the actual work to you; but I will give you the ideas."

"What are we going to do?"

"First, study these Conquerors. It is no secret that they are sick. We must find out just what that disease is and the cause of it. Then we must find a cure. When we have that cure, then we can start in to play poker."

"*Poker!*"

"Yes, with our human race as the stake. Your nation and mine—their future destiny. My word! What a game that will be!"

"I really do not understand?"

"You don't have to. Only start in to work. Pull out of your subconscious every scientific fact that you ever heard or read of. Think! Co-ordinate those thoughts. Originate new ones. Invent! Produce! Do something!"

Wright's jaws tightened.

"I'll do my best!" he said tensely.

The Englishman slapped him on the back.

"Good lad!" he muttered. "I knew you would, True gold is your metal."

From that morning on, the three ladies and Ormond saw little of their friends except at meal times; and even then they were not very satisfactory table companions. A complete laboratory had been constructed in one of the rooms in the apartment and there the two men, with various specialists to assist them, spent most of their time. Sir Harry felt safe in having these Conquerors assist him. They had certain knowledge that was valuable to him, but they seemed curiously unable to value or apply their knowledge. The specialist in organic chemistry realized that fact and commented on it to Wright one day.

"There is no doubt," he said, "that our knowledge is very complete; but for many years it has seemed to be almost useless. Our specialist in sta-

tistics told us at a recent annual meeting that our inventions are now only three one hundredths as numerous per century as they were five thousand years ago. Of course, we might say, as a defensive reply, that there is hardly anything left to invent; but that, of course, would not be true. We simply have reached the point of which we do not use the knowledge we have; either we cannot use it, or we lack the psychic urge to do so. Perhaps, if some great calamity overpowered us, it would act as a mental stimulus, but otherwise—Oh! well—it seems that we do not care. Nothing matters; and so we simply spend our days in rehearsing the knowledge we have, and our night in broken slumber, disturbed by headaches."

His story was but a variation of the confession made by the Directing Intelligence to Sir Harry. The leader of the nation had not exaggerated the difficulty. It was apparent to most of the specialists that something very serious was wrong with the psychic life of the nation. A few had reached such a point of mental apathy that they no longer cared.

But day by day Sir Harry and Mallory Wright worked on. They made an intensive study of the ichor, the fluid that flowed through the circulatory system of the Conquerors instead of the rich red blood of the normal human being. They studied this ichor from every possible point of attack. The spectroscope, the test tube, the microscope, and every known chemical reaction was called in to determine what it was and what it lacked. At times Wright became so tired of this mysterious ichor that he rebelled at any further study; but the Englishman urged him on.

"Hang on to it, Mallory, old top. Bite into it and clamp your jaws. Right there is the thing we are after, the hidden ace that is going to win our poker game for us. It is their blood; and blood means life. My word! I know that little girl is hungry for your companionship; but you must work. Forget the fact that you are working to win a game and just concentrate on what it will mean to you two if we succeed."

And Wright would wipe his worried brow and start to work again.

One day the specialist in bacteriology came sauntering into the laboratory. His face was as emotionless as the faces of all the race, but in his eyes there was a peculiar cruel glitter.

"I have felt better for a whole week," he told Sir Harry: "For months I have done but little work. A few days ago I started and now I am through. I have discovered and perfected a strain of microbes, deadly bacilli, that will so quickly destroy the Middle-Men that they will all be dead before they realize what is wrong with them. I was asked to do this bit of research work some years ago; but I just could not start to work. I have done it now. The rest will be easy. All we have to do is to make a large amount and scatter it over the earth from our airplanes. The making of a preventative to give to the human beings in our various colonies will be easy. Of course we do not want them to die with the other Middle-Men."

"I guess the human race is better off dead," commented Sir Harry. "It seems that they have not merited the right to survive."

"No, they are doomed," replied the specialist as he sauntered out of the laboratory.

"From now on," whispered the Englishman to Wright, "we work alone, and when I say work I mean it. Think of that game, lad, and concentrate. My word! What a stake!"

CHAPTER XVI

Anxious Days

BUT it seemed that their very need, their overwhelming desire to accomplish their purpose thwarted them. Again and again they seemed on the verge of success only to be again faced by failure. It remained for Miss Charlotte Carter to break through the hard surface of the scientific enigma and give them a starting point toward success. In the first place, she insisted on a conference of the six companions.

"Some thing has to be done," she announced emphatically. "Time is passing and whatever dangers we are faced with are growing more and more threatening. You two men have become absolutely antisocial. You act as though no one existed except yourselves. I think that we ought to talk the problems over and see if we cannot help you. You have spent so much time in worried thinking that there is just a possibility of your brains becoming dull. We women have had a lot of things to think about, while poor Ormond thinks of nothing but his elephant gun and whether he will ever be allowed to use it. I wish you would be reasonable, Sir Harry, and tell us at least a little about it. Some of the rest of us are interested and we have had a liberal education as well as you and Mr. Wright. We are still able to think; perhaps better than you can."

The Englishman finally agreed. He realized that such a procedure had its dangerous elements. Suppose they were being carefully watched all the time by the television machine? Every word they spoke, in fact almost every thought, would become known to the Conquerors. It might end in the death of all of them. At the same time, he knew that there was a great deal of truth in what the lady from Virginia said. There was no doubt that over-concentration on the same problem frequently prevents success, while a fresh mind would have but little difficulty in solving its intricacies. So he yielded.

There was another conference. Ormond, as usual, was polishing his big rifle. The two young women sat next to each other; they were more interested in the development of the New York Colony than in the experimental work that was being performed in test tubes. Mallory Wright sat

for the greater part of the discussion with his face buried in his arms, on the table; he was tired and mentally exhausted. Even Sir Harry talked with the greatest effort in order to put the problem in such a shape that Miss Charlotte Carter would be able to see it. At last he finished. She smiled.

"My dear boy. How simple. You have been trying to make a compound which, injected into the circulation of these dwarfs, will restore their mental poise, give them inspiration to do their work and solve their problems. You have been working at it from the standpoint of their internal secretions. Terrible! Your idea was that, when they deprived their bodies of the secretions producing emotions, they also lost something else; and the continued loss of this, through centuries of inbreeding, produced a psychic apathy. That is your view and I think that it is correct. But why not leap across the chasm, instead of painfully trying to crawl down the side to the bottom and then as painfully crawl up the other side to the top? They lack something and you have it. I suppose you know by this time the exact composition of their blood. Make a similar examination of ours and determine the difference. See what there is that you have which they lack. Put those missing elements into a compound and inject it into them."

"But—my word! Miss Carter. Clever and all that; but there are twenty thousand of them. It would exsanguinate me to furnish them all with my blood."

"I never thought that you would. I simply said that you should find the difference and make a compound out of your blood; just enough for an analytical study. Then make a formula of that compound and produce it synthetically in the laboratory. Only memorize the formula and never, never, put it down on paper. Try it, Harry. Please try it—and do not take any more of your blood than is necessary. Oh, I wish that you would let me help you!"

After that, work started anew. The three, for now Miss Carter spent her days in the laboratory, began to work with new vigor. She had given them a possible solution of the puzzle and with that new thought to work on their progress was rapid. In a week they had the compound formed out of Sir Harry's blood. In three more days they knew its exact composition and in another week they made about a gallon—enough to cure over a hundred of the dwarfs of their psychic apathy. The last few days Sir Harry insisted doing all of the work himself. He explained to his companions that something might happen to Wright and if it did, it would be vitally necessary for the work to go on.

A Decadent Nation

THEY had been able to manufacture a synthetic serum which they believed would solve the secret of the decadence of this strange race. Ormond, in one of his few periods of loquacity, made no effort to hide his idea of the folly of such a step.

"Give them time," he explained to Miss Antoinette, "and they will find that we have double-crossed them; but if I had been Sir Harry, I would have bluffed them, delayed the laboratory work, done everything I could to put them off from month to month and never, never, have deliberately produced a drug that would make them more efficient than they are already. Here they are, making the final steps to kill all of our race, and Sir Harry and Wright and your aunt fairly killing themselves in their effort to help them out of their difficulties."

"What is this poker game he is always talking about, John?"

"That poker game is like my elephant gun; it is just a specimen of his humor. He told me to take my elephant gun; said that one could never tell what need there might be for it. Once a day since then he has asked me if the gun is in good condition. Have I shot it? Just once? I have not! That is the way with this poker game. He thinks that it is funny. Just an example of his English humor."

Perhaps Sir Harry knew how some of his party felt; but if he did, he showed no signs of it. He simply went on with his work and with Miss Charlotte with him constantly he was brighter than before, smiled a little and even laughed at times. Then one day he filled a glass syringe with the new solution, carefully placed it and a sterilized needle in his pocket, said good-bye to his co-workers and went out.

The time had come to play a poker game.

Three hours later he was sitting at a table around which were grouped the Directing Intelligence and the three Co-ordinators.

Sir Harry lost no time in telling them the reason back of his asking for the conference.

"Some months ago the ruler of your nation took me into his confidence. He stated that our nation, for you know that I have been made a Conqueror by adoption, is threatened with a situation so serious that, until it can be solved, all thoughts of the exploration of space would have to be abandoned. In other words, the specialists are becoming so dull mentally that it is extremely dangerous to face the countless new problems that will be presented attempting space travel in our present condition. He asked me to try and do something.

"First, let me take up the less serious conditions. Your queens have a condition known among my former race as hyperthyroidism. It is nothing more or less than an enlargement and oversecretion of the thyroid gland in the neck. I am sure that the condition is the result of an excess of iodine in their food and water. Give them quinine hydrobromate to reduce their pulse rate, add extract of ergot, if necessary, take the excess of iodine away from their food and water; and I am content that their health will be so greatly improved that the future units of our race will be healthier in every way.

"The second minor problem is the one of your constant headaches. As I have reason to know from my past studies, your brains are very large.

Consequently, the blood vessels in your skulls are large and I believe that the pressure of the circulation is the main cause of the headaches. I will take that up with the specialist in medicine and suggest to him the proper treatment; though I am sure that just as soon as I give him the hint he will be able to go ahead. I am just surprised that he was not able to see what was the matter himself."

The Directing Intelligence slowly turned his head until his large dilated eyes were fastened on the Englishman. Then he spoke:

"There is no reason for your being surprised. He has had the same mental inertia that has overcome all of us. Our stagnation has been almost complete. For years we have just been going around in intellectual circles. Our program has been halted. For over a thousand years our space machines have waited, unoccupied, for the completion of our program. Some of our specialists have been seriously ill, others have just been mentally dull; not one of us has been normal—by that I mean the normality of our race ten thousand years ago. Our replacements have been many, but not in the positions of trust and responsibility. I want to give you an example. I will send for the specialist in medicine and show you just why he was unable to solve these problems that seem to your active mind to be so easy."

After fifteen minutes of waiting, the specialist in medicine walked into the room and took a chair at the table.

"Have you any reports to make?" asked the Directing Intelligence.

"None."

"One hundred years ago, I asked you to make a thorough study of the queens and see what was necessary to improve their health. Have you done that?"

"I have. But I am unable to solve the problem of their illness."

"Have you arrived at any idea as to the cause of my own headaches?"

"No. I have the same trouble myself. I try to work on these questions. I know all about medicine that was ever known by our nation; but, for some reason I seem to be unable to use that knowledge efficiently. I cannot put the facts together in a new way and accomplish my work."

The Directing Intelligence turned to Sir Harry.

"This is a very good illustration of why the interplanetary journey has been postponed for hundreds of years."

"I understand. That is the problem. But suppose I have a drug that will restore his mental vitality, make him capable of using the vast store of knowledge he undoubtedly possesses? If I can do that with him, will you believe that I am capable of doing the same to the entire race?"

"I will believe. If it can be done with one, it can be done with all. But have you the drug?"

"I have. I brought one dose of it with me."

"You have my permission to give it to this specialist."

The Serum Works

THE Englishman walked over to the physician and rolled up his sleeve. From one pocket he took out a rubber tube which he applied above the elbow as a tourniquet. From another pocket he took out the sterilized needle and the syringe. Then he painted the skin in the fold of the elbow with a red antiseptic. Already the veins were beginning to be prominent.

"I have in this syringe," began Sir Harry, almost as though he were lecturing to a class of students, "one dose, twenty cubic centimeters, of a serum which I intend to give through the vein. Thus, it will enter the circulation at once and in a few minutes the nervous system, especially the brain. I believe that one dose will be sufficient to establish the potency of the drug. Of course, later on, it may be necessary to repeat the treatment; but that is a matter of secondary importance. Now I will puncture the vein slowly and empty the syringe into it. The operation, as you see, is practically painless. There! It is all over. Now I hope in a couple of weeks we will see the results."

The next two weeks that passed were filled with the most terrible anxiety for the six earth beings. Attempts at gayety fell flat as all waited under growing tension for a call from the Directing Intelligence. It was understood that the specialist who had been treated was to remain in isolation during the period, so that the effect of the medicine might be more properly evaluated.

At last, one day, the call came; and a white-faced Sir Harry Brunton, barely able to maintain his jaunty air, found himself in the presence of the Directing Intelligence, his co-ordinators, and the treated specialist.

Throughout the room a deathlike silence reigned until the Directing Intelligence spoke to the specialist.

"How do you feel?"

"Somehow, I feel better. My mind seems to be clearing. Now, in regard to that problem of the health of the queens. There is no doubt that they are receiving too much iodine and that has caused an over-production of thyroid juice. We will give them quinine hydrobromate, reduce the iodine content in their diet; and I feel sure that they will soon be well."

"How about the headaches?" asked the Directing Intelligence.

"I see the cause now. The blood pressure is too high. Nitrates will reduce the pressure and cure the headaches."

"I asked you the same question many years ago. You took a long time to answer."

"I realize that. But I could not think then. I can now. This new medicine has given me wonderful vitality, mental alertness, an ability to use my accumulated knowledge. In some way I feel that I

have been sick, but I am all right now. I feel as if I were a new man."

Sir Harry began to smile.

"My word! It worked as expected!"

"It did," acknowledged the Directing Intelligence. "How soon can you start in treating the entire nation?"

The Englishman rose to his full height. He towered above the seated dwarfs.

"There are a few things that I want to make clear. In the first place, I am the only living person who knows how to prepare this drug. I have enough to treat about one hundred persons. After that it will be necessary to make more and I am the only one who can do it. I want you to understand that fact. I am the only one. Now I am anxious to make enough to cure the entire nation, because I want you to go on that interplanetary journey and I want to go with you. In fact, I think that you need me.

"But life as I see it is largely a matter of compromises, gives and takes. Of course, you have ruled so long that you can see no viewpoint except your own. I want to help you, but I want to be paid. I want you to promise me that you will make no effort to kill the Middle Men, the race I come from, till we return from the space trip. There will be time enough then to deal with them as you wish. The second request is for permission to liberate my five fellows and send them back to their comrades and their civilization. I am sure that they can be trusted to keep their adventures here a secret. In fact, I will myself be a bond to make sure of that. If you will grant me these two requests, I will start at once making enough of the drug to cure the entire nation of this peculiar devastating mental illness."

Though they were incapable of showing emotion by facial change, there was a deadly glitter in the eyes of the dwarfs who looked up at him. The Directing Intelligence expressed their thought.

"Impossible! Why should we bargain? You are here, and in our power. Suppose we force you to show us how to make the drug, and then kill all of you?"

"You can do a part of that; but, remember, I am the only one who knows every step of the process whereby this drug is made. If I do not make it, it will not be made. I anticipated your refusal; so I came prepared to play what we call poker with you. I hold in my hand a thin glass vial, containing a few drops of a deadly poison. I am going to place it between my teeth. If you refuse to agree with my suggestions, I will crash the glass and die. Then, where will you be? You can kill my companions, you can kill every human being on the face of the earth, and then you can dully sit still and wait for your nation, the nation you are so proud of, to die. And you will have the agony of knowing that, in spite of your wonderful accumulation of knowledge, you are doomed, because of your inability to make the best use of it."

And he placed a large glass bead in his mouth and closed his lips.

The Bluff Wins

THE five dwarfs faced him. He sat down and faced them. For five minutes there was a conflict of wills, a battle of intellects. Then the Directing Intelligence spoke:

"You win. We will grant your requests. After all, we need a person like you with us when we take that journey into space. You have something that even the best of us lack. Perhaps it is youth. I will give orders that the Middle Men be not harmed. The New York Colony will remain closed, and your five companions will be liberated—on condition that you remain with us, make enough of the drug to cure the race and take the journey into space when our nation starts on its explorations of the unknown."

Sir Harry took the glass bead out of his mouth and put it in his pocket.

"That's a bargain," he replied: "I am confident that it is the best thing to do for everybody."

"By the way," asked the Directing Intelligence: "You said that this was a poker game, what did you mean by that?"

The Englishman took out the little glass bead and rolled it on the table.

"My word! Had to explain. Poker is one of those American games. It is built on a bluff. You pretend at times to have cards when your hand is devilish poor. Take that glass bead, for example, It is solid. No poison in it. But you thought so, and I won a part of the game because of your belief. Poker? I should say so. Suppose you had called my bluff? Made me look silly, pretending to die from poison when there wasn't any? Well, I must go. I am going to be right busy, making over nineteen thousand doses of that medicine. You can go on with the program now and have the definite assurance that everything will be all right."

He walked out of the room. The dwarfs looked at each other. One of the co-ordinators broke the silence.

"He is a very capable man. Knowing one thousandth of what we know, he was still able to make such good use of his little knowledge that he won the game of poker, as he so peculiarly expressed it. Well, our word is passed and, after all, we can kill those Middle Men when we return from our voyage through space. For we know now that we are going and we know that we will return."

The Directing Intelligence added:

"At least we know that a capable consultant is going with us."

CHAPTER XVII

A National Treatment

THE Englishman returned to his five companpaniona. Ormond was still polishing the elephant gun. The two young women were whispering to each other. Wright was trying to

console the elder Miss Carter, who was crying.

"Cheerio!" cried Sir Harry: "What mean these tears at the point of victory? 'There is a tide in the affairs of men which taken at its flood leads on to fortune,' and we are all swept with that tide to a happy ending of our adventures. You are going home. Do you understand? Back to the States and your little old New York. The game of poker was played and we won."

"Yes, Harry," said Miss Charlotte, amid her sobs: "We know all about the way you won. We had you under observation in the television machine from the time you left us till you started to come back. We know what you did—to secure our freedom. It was nothing much, was it? 'Just a promise on your part that you would go with them to Mars or Saturn or Venus, or wherever it is they are going. Just a promise that you would stay with them till you died of old age, and all to get liberty for us. What do you suppose that I—I mean, what do you suppose we care about New York, if we know all the time that you are with these horrid monstrosities?"

"Now, Miss Charlotte," pleaded the Englishman; "please do not talk that way. I am sorry you used the television screen. My word! Your scolding me that way makes me feel like wilted lettuce. And all the time I was thinking that I had done something worth while in securing your liberty and saving the human race, at least, for a little while."

"It was fine," chimed in Wright: "You were wonderful, but Miss Charlotte naturally feels that all of us ought to have stuck together in this adventure."

"I do not want you to look at it that way. You should consider the welfare of our race, the men and women, the Middle-Men, who art trying to make a success out of life by attaining to happiness, and are making such a botch out of it. You go back to them. Go back as missionaries. Show them that there is something more in life than just fame and wealth. Try to develop a spirit of national sacrifice, a unified soul that will be able to face any threatening danger and triumph. Now, let us go to the laboratory. Just as soon as we make enough serum and give it, I am going to send you five dear people back home. You will help me, won't you, Miss Carter?"

"I will help you all I can, but, nevertheless, I just despise you for the way you are acting."

"And I suppose," said Ormond, "that while you are working, I can go ahead and polish the elephant gun and take the ladies on sightseeing expeditions?"

"And do not forget the elephant gun," advised Sir Harry, laughing.

For the next week the three scientists worked long hours in the laboratory. Over nineteen thousand doses of the life-restoring drug were ready for use. Word was sent to the Directing Intelligence to assemble the nation at the Reelfoot Crater. Five days later every unit was present; the Directing Intelligence, the Co-ordinators, the specialists and the directors.

Often in the past they assembled to witness the peculiar rites of their nation, and watched long lines of discards pass silently and without emotion into the lethal chamber. Now, for the first time, they had gathered for a constructive purpose instead of a destructive one. Word had been sent that they were all to be given a dose of a new serum that would restore the intellectual vitality of the nation. After that they would all go into space for greater achievements and to larger glories and conquests. They were emotionless, but one and all they were doing a lot of thinking. Even the dullest among them realized that it was an occasion that promised much for the future of their nation. Sir Harry, Mallory Wright and Miss Charlotte stood near spotless tables where they were assisted by a number of specialists who had received their treatments a few days before.

Then the line of dwarfs, headed by the Directing Intelligence and the co-ordinators, began to move forward, and each unit, as he passed the table, was given an intravenous injection of the serum. Hour after hour they passed while, hundred by hundred, the nation was restored to vitality and mental vigor. Muscles ached, brains reeled, the limit of endurance was reached, still the three scientists kept on and, at last, nearly dropping from fatigue, they reached the end of their labor. The entire nation of Conquerors had been treated.

Sir Harry told Wright to take Miss Charlotte back to the apartment. Then he walked, with steps showing utter exhaustion, up to the chair where sat the Directing Intelligence.

Success

"MY part of the contract has been fulfilled," he whispered: "My word, but it was a greater task than I thought it would be. Tomorrow I want to send the five back to their homes and their friends. Will it be all right?"

"It will be all right. Bring them to the edge of the crater. The radio-controlled boat will be in readiness for them. Place them and their baggage in that boat and I will see that they are taken to Tiptonville; from there they will find their own way. They will not be harmed. You, Sir Harry, have won the undying gratitude of our nation. You shall be repaid by being permitted to go with us into space."

"That will be quite jolly."

"What do you mean?"

"Oh! That is an emotion. You could not understand, but I shall be glad to go. Remember, you have promised not to destroy the Middle Men till you return."

"I remember. Now, I must start to prepare for the trip. I feel new life, new mental vigor. That drug was wonderful. The entire nation will have new life. I suppose that you will want to spend

the rest of your time with your companions before they leave?

"Yes, I will go and say good-bye to them."

"You show no emotion at the thought of leaving them?"

"I am too tired to show anything."

* * *

"So, tomorrow," Sir Harry concluded, "you five people are going to get in the little boat and go back to Tiptonville. From there you can get to New York. Once there, communicate with the British Consul and he will pay you. Wright, you go over to London as soon as you can, and see the Prime Minister and give him an outline of these weeks; and I suppose the President of your country will be interested. Tell him that I consider that there is no immediate danger, but they should consider the future years very carefully and see what they can do. I do not want any offensive taken against the people who have adopted me."

"And are you going to stay with them all the rest of your life?" asked Miss Charlotte Carter, in a low, dull tone.

"I think so. I gave them my word of honor to do so for as long as they need me and want me. That was one of the prices I paid for your liberty. You five can go back now to—your loved ones—"

"Oh! How clever you are! Back to our loved ones!" and she left the room, saying over her shoulder: "You must excuse me. I shall be so busy packing that I will probably not see you again till the little boat starts for Tiptonville. Good-bye."

"Auntie is decidedly disturbed," commented Miss Antoinette.

"What is the trouble?" asked the Englishman.

"You would not understand if I told you. Do you know that I think Englishmen are the most stupid persons in the world? Why, Mallory and John saw what was the trouble with us girls right away and they have just been wonderful."

"My word! You make me feel like—" but he never finished that sentence, for Miss Antoinette jumped up and faced him, as she cried:

"If you dare to say 'wilted lettuce' again, I am going to scream or do something worse. I think without exception you are the dumbest, coldest, most stupid man that ever was created and you have just about made poor Aunt Charlotte half insane over you," and she left the room.

"Ormond," asked Sir Harry, "do you know what these women are talking about?"

"I don't know and I don't care," growled Ormond: "I think you have acted like a fool in giving in to these dwarfs the way you have. We might have made a fight for it. Think how it makes me look. Going back to Washington and New York and tell them that we left you here for the rest of your life, practically a prisoner. They will ask where our guns were and why didn't we make a fight, and I will have to say, 'Oh! Yes, we had firearms. Why, I had an elephant gun, and Sir Harry would not let me use it!' Think of it. Carrying that gun from New York here, and back to New York again, and never having a chance to make use of it—not even once, and me a crack shot, a big-game hunter, a sportsman! And all you have told me to do the last month was just to take care of the ladies and make them happy and take them on picnics. And—oh! hell!! Put yourself in my place and imagine how it makes me feel!"

Back to Civilization!

SIR HARRY spent the rest of the day and much of that night in conference with Mallory Wright over his report. There were things that he wanted told and other things that he felt had better be ignored. The big thing was the fact that the human race was safe, at least, for the time being.

The next day came, as all next days come, at the end of twenty-four hours. The six companions walked down the earthen steps to the motor boat. Their baggage had been carried there earlier in the day. Orders had been given that during those minutes when the five said good-bye to Sir Harry they were to be left alone. It was a beautiful day, and the two girls and the New Yorkers were almost jolly in spite of their sadness over leaving Sir Harry. A double wedding was to be celebrated in New York as early that fall as arrangements could be made for it. The four young people were very much in love. They stepped into the boat, rearranged their baggage and waited for Miss Charlotte. She stood on the bottom step, alongside Sir Harry.

"Come on, Auntie," cried the girls.

Just then the boat started to leave the shore.

"You will have to hurry," cried Wright.

But the little lady scientist simply smiled and drew nearer to the Englishman's side. Twenty feet of water lay between the boat and the step.

"Good-bye, girls," Miss Charlotte Carter said, gayly: "Give my love to the family, and I hope the four of you will be very, very happy."

"But what are you going to do, auntie?" shouted one of the girls.

The little woman made a speaking trumpet out of her hands as she shouted back over the water:

"What—does—it—look—like?"

"My word! Miss Charlotte, what does it mean?"

She looked up at his bewildered face and smiled as she stroked his arm:

"It means that I am going to stay with you—all your life—here—or on any other planet—and I am doing it because I love you—you poor, stupid dear."

"Do you know how this makes me feel?"

"Oh! I suppose like wilted lettuce or over-ripe strawberries or something, but I hope that you soon will feel like—a man in love. You do love me, don't you, Harry?"

"My word, Yes. YES!! Let's go back to the apartment and start the television thing. I want to keep in touch with those young people till they are safe."

Back in the apartment they darkened the lights and turned on the picture. The boat was shown,

rapidly darting through the curving water lanes, and finally landing at the dock at Tiptonville. The four young folks jumped out, divided the baggage and started to walk down the road. Turning on the sound portion of the machine, Sir Harry and Miss Charlotte heard enough to know that, in spite of regrets over leaving two of the party in the crater, still the four on their way to New York were in the best of spirits. Suddenly there came from the screen the sound of a loud baying and from over the crest of a hill a savage dog ran rapidly toward the little group of travelers. John Ormond fell on one knee, swung around his elephant gun, took aim and fired. The dog disappeared with the explosion. Ormond stood up and started to smile as he petted the gun lovingly.

"Oh! This adventure is ending perfectly," cried Miss Charlotte as she threw her arms around her man. "Just think! All six of us going to marry and poor old John Ormond finally had a chance to use that gun."

"Righto!" agreed the Englishman, kissing her.

"And perhaps when when we all gather for a grand reunion," said the little lady scientist from Virginia, as she buried her face in her lover's coat, "perhaps we can get him to tell to our grandchildren how he killed an elephant, Harry, dear."

"My word!" whispered the Englishman as he scattered kisses on her white hair. "You make me feel—like a Conqueror."

And he turned off the television.

THE END

The Fitzgerald Contraction

(*Continued from page* 695)

radio, a picture on the cigarette ads, they can become wealthy as well as famous over night."

There was a slight smile on the face of the Chancellor and several of the others. The Chancellor rose to speak.

Suddenly there was a commotion of heavy, hurried steps out in the corridor. Whoever was coming, was obviously excited, for he was pounding the floor at a prodigious pace. The next moment there burst into the room the police sergeant who was in charge of the guards around the photon-ship. His sun-tanned face was a study in breathless astonishment, as he sought out the Chancellor and handed him a white envelope.

"Did you see it?" he gasped. "Nearly made me blind. Can't see good yet. And when I could open my eyes, the thing was gone! Melted away! And all the guards blinkin' at the empty place! Gone! It's gone, sir! And this flopped down on the ground in front of us."

The Chancellor was handing the letter to me, I noted through my daze. My name was scrawled on it in Wendelin's huge hand. With a quick, alarmed glance, I searched the room. Wendelin was not in the room. Nor was Vayill!

I tore the letter open, with all the eyes in the room upon me.

"Good-bye, Bill," it read. Vayill and I have just been married. Vayill says she hasn't got the patience to live here. She wants to sail again, to taste adventure. A girl after my own heart. I'm going along. She says I'll never see you again. I don't know. That's why I'm telling you good-bye. Six of her people—the ones who refused to dress up in our kind of clothes—are going with us. Wendelin."

Wilma became ecstatic when I told her about it.

"Some honeymoon!" she exclaimed.

THE END

The Red Dimension

(*Continued from page* 701)

blood! The lower half of his face seemed to have been beaten into a mass with a blunt instrument! I screamed like one insane as I removed his helmet. Across his eyes and frontal arch, his skull was cloven in twain! The rays of the Red World had cut a deep gash through which had drifted the life of my dear friend and benefactor! How I managed to escape a similar fate I do not know unless from my mad movements to remove the helmet.

What must have happened was that our devices, not insulated against things of which Dr. Korsakoff could have known little or nothing, had acted like copper wires in the distribution of electrical energy. The Sixth Dimension beam, then, must have been carried along with our own to strike at us in our own distant plane.

Why tell of what followed—my apprehension for the crime and my conviction?

Now, dear world of which I am but a miserable outcast, praying for death to relieve me of my suffering, let me close this chapter in my book of life. If any story succeeds in reaching the world, the world itself will know and believe that I Arnoldi Kherkoff, did not murder my beloved benefactor, Dr. Ivan Korsakoff, as the courts of Russia believed! His was a murderer far beyond powers of man to apprehend. I suffer for the deed of a being in the Red Dimension—but not for long! I have little fear of the penalties exacted against prisoners of the camp for communicating with the outside world! When they learn of it, life will have already flown.

THE END

The Vapor Intelligence

(*Continued from Page 707*)

there is no particular reason why a sentient gas could not have evolved on some other planet, just as the human race has developed on earth. When we begin to consider the mysteries of space it is necessary to discard terrestrial conceptions. The idea of a sentient gas is no harder to grasp than the fact that one of the stars is composed of a gas over two thousand times as dense as platinum, and not nearly so hard to believe as some of Einstein's theories about the universe."

For want of a better explanation of the unprecedented happenings at Loon Marsh, Ruberg finally came to accept the theory of Walter and his adherents.

Shantytown remains a dead village. None of its former inhabitants could be paid, cajoled or driven back, even long enough to obtain their few meager belongings. They promptly and permanently attached themselves to Ruberg; and it is only fair to say that there is not a soberer, more law-abiding or deeply religious group now in Ruberg than these former Shantytowners.

Loon Marsh has regained its animal, insect and reptile population, but has never been able to lose its sinister reputation. Walter has long since moved to the city, and James too has left the state. There remains, however, one curious reminder of the visitor from space. Where the decaying matter of the mist-like substance that had emerged from the sphere fell to earth, it poisoned the soil so that the vegetation blackened and died. Nothing has grown there since. These queer bare spots are the only reminder left by that which came out of the sky.

* * *

When old Ruberg finished he became silent and puffed slowly on his meerschaum. I waited for him to speak; for his silence was too strong for me to break. But, finally, unable to rouse him, I rose and bade him good night. He answered me politely. And when, the next morning, I shook hands in goodbye, I saw in his eyes a light that begged me to believe his tale.

THE END

What Is Your Knowledge of Science?

Test Yourself by This Questionnaire

1. What are supposed to be the probabilities of another planet having life on it? (Page 681).
2. Why is the possibility of life like ours on another planet so remote? (Page 682).
3. How does the brightness of a body change with relation to its distance from us? (Page 682).
4. What is supposed to be the cause of the moon breaking away from the earth? (Page 691).
5. What is supposed by the Einstein theory to be the effect of material particles on space? (Page 692).
6. What is the Fitzgerald Contraction Equation? (Page 694).
7. What is the quantity of energy we obtain from burning a ton of coal? (Page 727).
8. What is the percentage of loss of the energy value in coal by burning it as we do? (Page 727).

. . . A Private MESSAGE

to SCIENCE FICTION LOVERS

To all lovers of science fiction, I have two most important messages. You will find them on pages 756 and 764. Be sure and read them!

HUGO GERNSBACK, Editor.

FUNDAMENTAL ERROR CONTEST
Prize Letters

IN our October issue, we published a story, "Into the Subconscious," by Ray Avery Myers. At the same time we pointed out to our readers that somewhere in the story a FUNDAMENTAL ERROR had been made, and announced a prize contest, offering $50.00 in prizes for the best solution of this error.

The response to the announcement exceeded by far what the editors had expected. There were over 8,700 letters received, which is a staggering total for a prize contest of this kind.

It is one of the most successful contests we ever conducted, and we may say that the results were flattering to the standard of intelligence of our readers, because only a small percentage—that is, less than 3%—of the answers received were actually erroneous.

We believe that our readers will agree with us that the five letters published here, which were awarded the prizes, come as close as possible to the conditions set forth in the contest, i. e., that the letters be concise, brief, and that the reasoning be logical.

While the overwhelming percentage of the letters had the correct answer, most of them were either too long, the ideas were not expressed clearly, or the logic was faulty.

Of the letters received which did not have the right answer, the greater proportion among them were those that believed it impossible for a human being to have animal traits. These readers, in our opinion, are mistaken; because science has proved that, indeed, every human being has somewhere in his make-up traits of some non-human animal, from which he was descended millions of years ago.

There were a scattering of answers that had to do with the hypnotic effects, which they claimed were wrong; and still others found it hard to believe that a motion picture of thoughts was scientifically possible.

There was one reader who claimed that there was no error because the reptile in the story may have adopted the lizard-like ancestor of Sam instead of killing him.

Of course, the correct answer was not immediately apparent, and we again express our pleasure that such a large percentage hit upon the correct solution.

FIRST PRIZE $25.00
The Dead Cannot Procreate

Editor, Fundamental Error Contest—

One who is dead cannot procreate. Hence no one could transmit to his progeny a recollection of his own death; even assuming that one could so transmit what is in his mind at the time of procreation.

The fundamental error in the story "Into the Subconscious," lies in having the subject recall the death of his ancestor.

Frank O. Everett,
Quinton, N. J.

SECOND PRIZE $15.00
A Physiological Impossibility

Editor, Fundamental Error Contest—

Since the Batrachian ancestor of the story presumably died in the encounter with the reptile, the sights and experiences of his own death could not be transmitted by him to any offspring; the assumption constituting a physiological impossibility.

J. W. Lodge,
1424 W. Congress St.,
Chicago, Ill.

THIRD PRIZE $5.00
Race Memory Has No Record of Death

Editor Fundamental Error Contest—

I note two mistakes in the story "Into the Subconscious."

First; instinct or race-memory is inherited, not from one, but from both of any individual's parents. Hence we would not have just one single mind handed down through the ages. Race-memories are inherited from every individual ancestor That is, if the Doctor read the mind of his subject 50,000 years ago, he would see not one mind but the minds of all the subject's forebears then living.

The second and more glaring error, which grows from the first, is this: The memory inherited from any parent must patently cease at the moment of the creation of the offspring. Therefore, the *race-memory contains no record of death.* That is, the subject's recollection of the moment of his death is an impossibility.

Jack Williamson,
Canyon, Texas.

FOURTH PRIZE $2.50
The Ape Who Perished

Editor, Fundamental Error Contest—

The logical error in Mr. Myers' story, "Into the Subconscious", arises in Dr. Macey's deductions from the reactions of the atavistic frog-man to the death scene in his supposedly hereditary memories. As the prehistoric frog-man was presumably devoured by the snake, he did not live to contribute to his race; hence, as he did not have any offspring after that experience, his thought imprints died with him.

The falling dreams, so common to mankind, are attributed to plunges from tree tops suffered by our remote ancestors, but the ape who perished did not endow anyone with the falling fantasy. The ape who fell, yet lived to beget his kind, transmitted to us those giddy throes of dream plunges in the dark.

In his reasoning the doctor confused the theory of reincarnation, with its consequent storage of actual memories in the subconscious strata of one individual mind, with the racial memories normally dormant in the many minds to which they have been transmitted by forebears in the ascending scale of evolution. With reincarnation, every pang of a specific demise could be recalled from the subconscious; but racial memories, being dependent on the process of generation for their continuance, preclude the possibility of a recollected death scene.

Miss Amy Rabson,
997 South Lee Street,
Des Plaines, Illinois.

FIFTH PRIZE $2.50
He Hadn't Died Yet

Editor, Fundamental Error Contest—

I can not inherit the memory of my father's death. For, at the time he begot me, he hadn't died yet. This is the fundamental logical error in "Into the Subconscious".

Felix B. Wadel,
Box 166, Tyler, Texas.

FIRST HONORABLE MENTION
Through Egg or Sperm

Editor, Fundamental Error Contest—

In reading the story "Into the Subconscious" I find the fundamental error as follows:

Subconscious thought, in order to be transferred from one generation to the next, must be transferred either through the egg or the sperm. In the case of Sam's frog-like ancestor, the scene or subconscious thought of its death was passed on to Sam. But this would be impossible; because no sperm or egg was issued after its death to carry this subconscious thought down through following generations to Sam.

Henry P. Jones,
366 Center St.,
Salt Lake City, Utah.

SECOND HONORABLE MENTION
Should Have Omitted The Episode

Editor, Fundamental Error Contest—

Mr. Myers, in his story "Into the Subconscious," commits his fundamental error in logic when he endows the subconscious mind of the experimental subject with the memory of the death of his own ancestor.

It is evident that an heritage, either physical or mental, can only be received at birth. The idea that the lives, or death, of the parents exert an hereditary influence upon the life of the offspring after his birth could be nothing but superstition. The frog-like creature who was supposed to have met his death as related in the story could not, subsequently to his own death, have procreated offspring to retain a subconscious memory of his death as seen through his own eyes.

The author should have omitted the episode from his story or else have changed the incident to a narrow escape, instead of interpreting it as an actual death scene.

Harry S. Bushore
National City, Calif.

THIRD HONORABLE MENTION
If the Creature Was Killed

Editor, Fundamental Error Contest—

The fundamental error in "Into the Subconscious" by R. A. Myers was as follows:

The subject, Sam, showed in his subconscious mind the life making the deepest impression on him. This proves to be the terrible end of one of his prehistoric ancestors. Now this, on the face of it, is impossible. Granting that the memories of the subconscious mind are passed on from generation to generation, only the events happening to the parent *before* the birth of the new offspring could be handed down. If the creature was killed, he *certainly* could not pass the impressions on to his offspring who had already been born, or was at least in an embryonic state.

Yours very truly,
G. Coleman Luck
1407 Hickman Road,
Augusta, Georgia

HONORABLE MENTION
Might Have Escaped

Editor, Fundamental Error Contest—

On page 459, column 1, and the October number of SCIENCE WONDER STORIES, is the error of the story.

"He also, unwittingly, showed us events leading to his death,—"

(*Continued on Page 754*)

First Prize, $25.00
Frank O. Everett, Quinton, N. J.

Second Prize, $15.00
J. W. Lodge, 1424 W. Congress St., Chicago, Ill.

Third Prize, $5.00
Jack Williamson, Canyon, Texas

Fourth Prize, $2.50
Miss Amy Rabson, 997 S. Lee St., Des Plaines, Ill.

Fifth Prize, $2.50
Felix B. Wadel, Box 166, Tyler, Texas

Science News of the Month

ASTRONOMY—METEOROLOGY

COLOR DETERMINES STAR'S AGE

The age of a star can usually be determined by its color, according to a study of Professor Stebbins and Professor Huffer of the Washburn Observatory, University of Wisconsin. The changes in the color of a star are similar to the changes in a piece of iron as it is heated. It becomes successively red, then yellow, then white. A red star is comparatively cool and has a temperature of only about 2,500 to 3,000 degrees, Centigrade. When a star cools, too, its color changes back to yellow, then to red. Our own sun is a yellow star of about the average in size and heat of those in the universe. Red stars may thus be either very young or very old. The white star is at the height of its maturity. For the observation of the light emitted by stars there is at the Washburn Observatory a photoelectric photometer attached to the observatory telescope; an instrument the result of fifteen years of research by Professor Stebbins and his associates. By means of it the changes in light coming from stars can be measured very accurately and thus the changes in the stars themselves noted.

SHOOTING STARS CLASSIFIED BY SPEED

According to Professor C. A. Chant, of the University of Toronto, the important thing for scientists to know in classifying meteors is the speed at which the bodies are traveling. There are two classes of "shooting stars"—those that travel faster and those that travel slower than twenty-five miles a second.

If the celestial visitor is going at a speed of more than twenty-five miles a second, and burns itself to nothing when it strikes the atmosphere of the earth, it is in all probability a fragment from outer space. Those which do not attain that speed probably originate in the solar system, of which the earth is a part.

EXPLORATIONS WILL DETERMINE LUNAR LIFE

The generally held supposition that the moon is a burned-out lump of volcanic material and does not and cannot support life is questioned by recent studies, says Waldemar Kaempffert in the *New York Times*. Recent evidence about the change in the size of craters and other parts of the lunar landscape seem to offer a possibility of volcanic action still in progress, and if this is true there may be a chance of some vegetable life, if no other. The chance of other life seems remote when one realizes that every two weeks the temperature changes from about 100 below zero to 250 degrees above, this violent change being due to the absence of any atmosphere to shield the moon from the sun's rays, and to hold in the heat that is received. The problem of determining what is happening on the moon will pass now from the telescope to the test tube, believes Mr. Kaempffert.

Scientists interested in the problem are attacking it from the historical point of view, determining how the moon came into being, and what has probably happened to it. With the use of ultra-violet rays the chemical composition of some of the lunar hills and valleys can be determined and from that the question of the presence of vegetable matter can be settled.

200-INCH TELESCOPE WILL INCREASE VISION TEN-FOLD

Telescopic power ten times as great as that given by the 100-inch reflecting telescope of the Mt. Wilson Observatory, now the largest in the world, will be at the disposal of astronomers when the 200-inch reflector of the California Institute of Technology is completed. It will penetrate three times as far into space as the 100-inch, and bring into view a globular region of space thirty times the volume of that reached by present-day telescopes. Work on the new instrument is now under way.

It will rise, when pointing near the zenith, 85 feet above the ground, about the same height as a six-story office building. The tube is supported in a "fork," so that it may be pointed to any part of the sky; and the fork is arranged to turn on an axis parallel to that of the earth. A powerful clock drive will turn the instrument around this axis once a day, thereby keeping it pointed to the same stars as they move across the sky. This arrangement is the same as in the usual "equatorial" mounting for astronomical telescopes.

According to Dr. George Ellery Hale in *Harper's Magazine*, with the aid of powerful telescopes, the vast experiments performed in the celestial laboratories have added to basic knowledge. The three vital tests of the Einstein theory can be made only with the telescope. Matter two thousand times as dense as platinum has been found in the companion of Sirius. Oxygen and nitrogen in "forbidden" forms have been detected in the excessively rare gases of the Great Nebula of Orion.

"The transformation of matter into radiation, predicted by physical theory, is attested by stellar observation. And now we may hope that the complex problem of the curvature of space will be settled by celestial measure. Can one doubt that a telescope powerful enough to carry all these studies far beyond our present possibilities will prove profitable, not merely to the astronomer, but to the physicist, the chemist, and to all who utilize the results of science in the many-sided problems of modern life?"

AVIATION

GYROSCOPE STABILIZER IS AUTOMATIC PILOT

The Sperry Gyroscope Stabilizer, the product of eighteen years of research, had a most successful demonstration in a Ford tri-motor plane, when it kept the craft on an even keel throughout a three-hour flight, and relieved to a considerable extent the strain on the pilot.

In effect, the gyroscope stabilizer is an automatic pilot, and much more sensitive to deflection from the course than a human pilot. It can detect a difference in direction of half of one degree, an angle too small to be observed, usually, by flyers. The device centers around two gyroscopes, one mounted horizontally and the other vertically. A series of electrical contacts actuates electromagnets, which in turn operate controls leading to the ailerons and rudder surfaces. The gyroscopes are driven electrically; power for them and for the mechanical operation of the controls being supplied by a wind-driven electric generator.

In operation, the peculiar properties of the gyroscopes cause the instruments to retain their fixed positions; and, when the plane moves laterally or in the direction of flight out of level flight, the craft actually rotates about the gyroscopes. By this movement, electrical contacts are established, energizing the magnets which, in turn, throw into clutch the controls which manipulate the control surfaces, bringing the plane back into level flight.

The stabilizer weighs only fifty pounds and occupies a space beneath the pilot's seat.

AIRPLANE SPEED TO BE DOUBLED IN TEN YEARS

Louis Bleriot, the first man to fly across the English Channel, predicted recently that within the next ten years it will be possible to attain a speed of 750 miles an hour by airplane. He recalled that, when he flew across the Channel, his speed was 60 kilometers (37.3 miles) an hour, whereas today the speed of nearly 600 kilometers per hour has been reached. On such progress, he said, we may base an expectation that today's speed will be doubled in the coming ten years. He expects to offer a Bleriot cup for speed contests between land planes just as the Schneider cup is for seaplanes.

DORNIER PREDICTS MAMMOTH PLANES

Dr. Claude Dornier, famous as the creator of the giant seaplane *DO-X*, has prophesied a glorious future for monstrous aircraft. Pointing to the success of his own machine as an example, Dr. Dornier predicts with confidence that, within the next ten years, giant seaplanes will be able to carry a useful load of more than 100 long tons. If the constructors of motors are able to keep pace with those who have developed the bodies of great planes to such a marvelous extent, the future will unquestionably belong to "giant flying ships."

The outstanding success of the machines will be estimated on an economic basis. The increase in their capacity to carry a large pay load will be the first important step in the future development of great land-and-water aircraft.

WARSHIPS TO BE HELPLESS IN NEXT WAR, SAYS MITCHELL

General William Mitchell, former commander of the Air Forces, A. E. F., and Director of Military Aeronautics, U. S. A., writing in *Aeronautics*, states that in the next war, our naval fleet will be practically helpless against attacks from the air. Picturing a typical battle, he shows how a great fleet of planes operating from a convenient land base could overwhelm the aircraft of any naval fleet and then, at its leisure, proceed to sink the fleet. With the development of great high-explosive bombs, gas bombs, torpedoes guided by radio, etc., warships travelling at 25 miles an hour have no chance against aircraft travelling at 150 to 300 miles an hour. The Panama Canal, he states, is practically defenseless against attacks from the air, for, despite all that a naval fleet could do, a few well-laid bombs would make the Canal impassable.

BIOLOGY—EVOLUTION

MISSING APE "THROWBACK" IN MAN

A French physician, Dr. H. Barillet, reports one of the most remarkable evolutionary "throwbacks" ever found. He has discovered a man, twenty-nine years of age, with the split breastbone characteristic of the ape. By means of the X-ray, it has been ascertained that the breastbone is divided into two parts, connected at the bottom, but separated by nearly two inches at the top.

In man the breastbone is in one piece, this formation having evolved by the fusion of bones which are separate in the lower animals. The discovery of a human being with the breastbone of an ape is another proof and a very good one of the validity of the theory of evolution.

"PEKING MAN" OLDEST HUMAN SPECIMEN

Scientists have agreed that the famous "Peking Man" is the nearest approach yet found to the "missing link" according to Hallet Abend, writing in the *New York Times*. The fossil, believed to be no less than 1,000,000 years old, takes precedence over the Piltdown man, the Java ape man, and the Heidelberg man. It is important, not only because of its age, but also because, unlike the other fossils mentioned, it was the only one sought for. The others were discovered by accident. The finding of the Peking man was the end of a long and persistent search on the part of a young Swedish scientist, Dr. E. Bohlyn.

As proof of the age of the fossil man, scientists point to animal remains found with him, which point out very clearly the geological period in which he existed. They serve to strengthen the theory that man originated in the East—in India or in China.

FIRST-BORN CHILDREN DECLARED NOT EXPERIMENTALLY DEFECTIVE

The old theory that Nature makes mistakes, and that she is apt to make mistakes in the physical formation of a first-born child which will probably not be repeated in later children of a family, is attacked by Madge T. Macklin of the University of Western Ontario.

Occurrence of malformations in a large number of families has been traced by Miss Macklin. In 987 families in which 1,000 children were born with defects usually considered not hereditary, it was found that the defects were as frequent among fourth and seventh children as among first-born; with a slight drop in the groups between. A much higher percentage of children who came ninth to thirteenth in their families were defectives; though these cases were few because of the rarity of large families. Out of 370 families in which there were 600 individuals with recognized hereditary defects, including "Mongolism," abnormal tendency to blood, and stiffened joints, it was found that 33 per cent. of the first-born children in these families were defective; 33 per cent. of the second-born and 34 per cent. of the third-born.

STAFF OF LIFE WAS OAK RATHER THAN WHEAT

Man does not live by bread alone, it seems, but also, and possibly to a greater extent, by acorns. The staff of human life on its long journey up through the ages, intimates Dr. J. Russell Smith of Columbia University, has probably been more nuts than wheaten. Wheat has almost certainly been in use only since man has practiced agriculture, and even today it is the food of only one of the four great divisions of the human race, the European-American; while among the three other great [illegible] are millions on millions of men who have never seen wheat or wheat products.

Acorns, on the other hand, were almost surely an important food during the vast unknown period of time when man gathered food where they had not sown, in the cool primeval forests of the temperate zone. Even today, according to Dr. C. Hart Merriam, in some cases as much as twenty per cent. of the food of the poorer Spanish and Italian folk consists of sweet acorns.

ULTRA-VIOLET RADIATIONS CHANGE ANIMAL FORMS

Microscopic animals have been modified by exposure to ultra-violet radiation during experiments conducted by Dr. Mary Stuart MacDougall of Agnes Scott College. During recent years, ultra-violet rays have become well known because of their extensive use in human therapeutics. The effect of such rays upon one of the simplest animals was studied by Dr. MacDougall who selected a tiny single-celled creature, known as *Chilodon uncinatus*. Exposure to the radiations for periods ranging from five seconds to two minutes produced profound changes in these creatures, which are normally shaped somewhat like oval discs. The modifications were of various types; some affected the internal structure of the cell while other changes were external. In the latter type of modification, there were changes in shape to elongated and "tailed" specimens, to double monsters; and to the formation of "chains" of several animals fused together. Some of these modifications were only temporary, while others persisted through forty generations.

BELIEVES COLOR OF HAIR IS GOVERNED BY HEREDITY

According to Dr. E. E. Free, writing in the *New York World*, a Berlin scientist, Professor Eugen Fischer of the Kaiser Wilhelm Institute of Biology, is studying human hair with a view to discovering more than is now known concerning heredity. For his purpose he has chosen people with hair of every hue of red, from the flaming variety to the mahogany shade.

Professor Fischer uses a new instrument which measures accurately the color of the hair. This measurement is made by means of a blending of discs operated by an electric motor. The point of the experiments lies in the determination of the causes of hair color.

The Professor's theory, that hair color can be explained by unknown qualities of heredity, is one of the most interesting advanced at the present time.

CHEMISTRY

HARDEST COMPOUND CUTS "UNCUTTABLE" METALS

Tungsten carbide, the hardest compound known to science, and for years a mere curiosity, has now begun to find extensive commercial use. With it, hard alloys, such as manganese steel and armor plate, can be machined in lathes, planers and shapers, says Dr Samuel L. Hoyt, of the General Electric Co.

One of the constituents of this remarkable substance is tungsten, the familiar metal of which the filaments of our electric lamps are made. Though years of research were devoted to finding a process of making tungsten so soft that it could be drawn into fine wires, when combined with carbon the metal makes a substance second in hardness only to the diamond. Tungsten carbide, known commercially as "carboloy," will scratch a sapphire, which is the second hardest natural mineral. At first, despite its hardness, tungsten carbide was too porous to stand the strain imposed upon a cutting tool. But researches of Dr. Hoyt and his associates have shown how these difficulties can be overcome.

MUSTARD GAS DETECTOR SOUGHT THROUGH CONTEST

International competition between chemists has been sponsored by the International Committee of the Red Cross at Geneva for the discovery of a detective reagent for *yperite*, the deadly mustard gas of the World War. The reagent must detect less than a thousandth of a grain of the *yperite* in about a quart of air and must be able to trace out the deadly gas without any doubt. The reagent and the apparatus for its use must be easy to produce in quantity, and reasonably.

The sum of 10,000 Swiss francs (about $3,000) has been granted by the International Committee of the Red Cross and will be distributed by a jury to one or several of the competitors, according to the value of the work submitted. The contest closes on December 31, 1929. The reagent adopted will be called by its author's name, and become the property of the International Red Cross.

ADRENALIN DEPOTS MAY FORM UNDER SKIN

A discovery by Dr. A. R. Lockhardt of the University of Chicago and Dr. Theodore Koppanyi of Cornell University Medical College, that the powerful drug adrenalin forms "depots" when injected under the skin, has opened the way for a new method of treatment of certain diseases. Adrenalin has long been used to raise the blood pressure, particularly in cases of shock following severe injuries or operations; and, because of its relaxing effect on the bronchial muscles, it has been used effectively in treating bronchial asthma. However, to produce the desired effect, the adrenalin had to be injected directly into a vein, and for each attack a fresh injection of adrenalin had to be made.

Drs. Lockhardt and Koppanyi have shown that in dogs adrenalin is capable of elevating the blood pressure, even if injected beneath the skin, when the injected area was gently massaged there was at once a very considerable and protracted rise in blood pressure.

"Science News of the Month"

portrays in plain yet concise language every important scientific advance during the month. Nowhere can the average reader get such a wealth of accurate and vital information condensed into such a small volume. Some 42 scientific journals as well as a score of other sources are utilized by our editors in the compilation of this department. The publishers welcome short contributions to these pages from the various scientific institutions, laboratories, etc.

NEW ANESTHETIC REMOVES FEAR

A new anesthetic which puts patients to sleep so pleasantly and easily that they ask for more, has been reported. Fewer unpleasant after-effects and far less danger than many of the local anesthetics are claimed for this new aid to surgery, which has the impressive name of *iso-amylethyl barbituric acid*.

The work grew out of the old problem of how to offset the bad effects of some local anesthetics. Many investigators have sought means of avoiding the occasional cases of poisoning by cocaine. According, *procaine*, a synthetic product, was developed as a substitute for cocaine. However, bad reactions very occasionally follow even the use of *procaine*. The investigators following along the line of some previous workers, found that certain substitution products of *barbituric acid* gave protection against convulsions from *procaine*. They reported their work with *iso-amylethyl barbituric acid* about a year ago.

SCIENTISTS FIND NEW WEAPON AGAINST DISEASE

Equipped with a *bacteriophage*, a brand new weapon against disease, scientists have failed to get the hoped-for results with it because they have not known exactly how to use it. This *bacteriophage*, a potent germ killer, was discovered by the French-Canadian, Dr. F. d'Herelle, now a Yale professor, and gave promise of being the world's greatest disease-conqueror. It has fallen short of fulfilling this promise because the men who had to use it have not understood it well enough to get uniformly good results. The hope of its discoverer and sponsors is that it will do the same thing to germs in the human body. In some cases it has killed the germs that were attacking the body, in others it failed to do so. N. W. Larkum of the Michigan Department of Health feels that the failures occur when the *phage* is used incorrectly through ignorance of the best conditions for it to do its work.

The age of the material, the method of administration, and the amount of the dosage are points that must be settled in order to get the most successful results with this new weapon.

MEDICINE

NEW CHILD DISEASE FOUND

A disease of children, known simply as *encephalitis*, a general term for inflammation affecting the cells of the brain, has been classified as one for which there has as yet been found no cure. *Encephalitis* shows itself by a fluid swelling of the brain and a marked enlargement of its vessels, with no external changes visible in any other organs of the body.

There are, of course, physical symptoms, such as gastric disturbances; but since these symptoms might point to a host of other diseases as well, the brain affection is well under way before it is discovered. It has already proved fatal in a number of cases, and the physicians who discovered it are at a loss to explain its causes.

BLAMES OVERWORKED EMOTIONS FOR DISEASE

Nobody really overworks as far as mind and body go; but we live at such a high emotional tension that we become tired and jaded and require violent stimulation to keep us going. Alas, this high emotional tension is the cause of a number of diseases, says Dr. Charles F. Emerson of the Indiana University School of Medicine.

"Under certain conditions a strong emotion can inflict a physical injury just as truly as can a knife," Dr. Emerson reports. "The injurious effect of a long-maintained depressing emotion has never, we feel, been appreciated. We endure well the effects of strong emotions, if only their duration is brief or their qualities varied. That the depressing, constrictin, paralyzing emotions called fear, apprehension, worry, etc. weigh heavily in the balance against a patient during the course of an infection has long been suspected; but since these phenomena cannot be weighed, measured nor rendered objective, we cannot at this point consider them seriously. The effect, however, of these emotions can be measured."

WATCHES LIVING CANCER CELL

A world-famous microscopist, Francis F. Lucas, has discovered a method for seeing into the life processes of the living cell, without in any way damaging the cell or causing it to change its action.

Mr. Lucas has devised an instrument to photograph only what is on a level with itself; in this way obtaining an authentic cross-section of the working of the cell. By means of the new method, he has been able to examine the living cancer cell, and it is believed in medical circles that this new knowledge will be of unusual importance to man in his fight against that disease.

TRACHOMA IS LEADING CAUSE OF BLINDNESS

The chief cause of the nearly two and one-half million cases of blindness existing in the world today is trachoma, states Lewis H. Harris, managing director of the National Society for the Prevention of Blindness. This disease is found in nearly every part of the globe, but it is at its worst in Oriental countries. It is most prevalent in Egypt and along the borders of the Mediterranean Sea, in Palestine, China, the Balkan States, India, the hot portions of Brazil and in our country among the inhabitants of the Appalachian and Ozark Mountain districts and among American Indians.

Trachoma is a highly contagious disease. The roller towel has been the cause of many epidemics of the disease in industrial plants. A common family towel is also a potent spreader of the disease among members of the same household. Poverty, crowding, the unsanitary living conditions are important factors in the contraction and spread of trachoma. The disease causes redness, painful inflammation and granular growths, looking something like sago, within the lids. These irritate the cornea, producing ulcers and later scars. The scar formation may produce an opaque layer covering the pupil which results in loss of sight.

NERVE-MUSCLE SYSTEM COMPARED WITH RADIO

The human nervous system has generally been compared to a telegraph system; but Prof. Louis Lapicque in a recent lecture at the Harvard Medical School has likened it to radio. While connection is important in telegraph or telephone systems, time is the important factor in neuro-muscular relay, Prof. Lapicque discovered, just as wavelength is important in radio. A series of radio receivers, tuned to different wavelengths, will get different stations or incoming messages and so different muscles, tuned to different time standards, will get messages, or stimuli, from different nerves. When a nerve carries a message from the brain to the muscles of the leg, for example, it is the time factor that causes the nerve to deliver its message to the set of muscles that extends the leg, rather than to the set that draws up the leg.

CAN THE BRAIN BE SLICED?

According to Dr. Kenneth S. Lashley, of the University of Chicago, President of the American Psychological Association, the human brain may be cut, and the individual subjected to the operation will suffer no very serious after-effects. Ernest K. Lindley, writing in the *New York World*, reports that, in Dr. Lashley's opinion, the cerebral cortex, the main portion of the brain, can be sliced off, turned round, and reconnected with its fibres without causing the death of the individual.

The victim of the operation might have to be re-educated, but he would display normal capacity in his re-education. The theory is used to attack the Behaviorism advocated by Dr. John Broadus Watson, the famous psychologist, which has caused a great deal of controversy in scientific circles.

Dr. Lashley and others have experimented with rats; and the conclusions drawn by them are that the higher mental processes are not mere combinations of reactions or "reflexes."

PHYSICS

STUDY METHODS OF TESTING RADIOACTIVITY OF WATER

With a market flooded with waters, salves, hair tonics, tissue creams, mouth washes, healing pads and other preparations alleged to have great healing power because of their radioactivity, government chemists are working on suitable means of detecting the presence or absence of radio-active substances in water and drugs.

The discovery of the curative properties of radioactive substances has resulted, among other things, in the production of solid, semi-solid and liquid preparations which are being sold as possessing sufficient radioactivity to cure all kinds of conditions. A recent government survey of such waters and drugs has revealed that their medicinal efficacy was much misrepresented. Action will be taken, under the Federal Food and Drugs Act, against shipments of the alleged radioactive products which are falsely or fraudulently misbranded under the terms of the law.

Radium and radioactive substances have possibilities of great harm as well as great good, it is also declared. Using them indiscriminately without adequate supervision is extremely dangerous.

QUESTION OF ETHER AGAIN CONFRONTS SCIENTISTS

Science still must answer the great and fundamental question: "Is there an ether?" Prof. Dayton C. Miller has reported to the Optical Society of America meeting that during the past year he has laboriously repeated ether-drift experiments that he has been making during the last nine years in a Cleveland laboratory and on high Mount Wilson in California. He finds in the light-path of his apparatus an observed effect such as would be produced by a relative motion of the earth and the ether of about ten kilometers (six miles) per second. This is the same result that Dr. Miller has obtained during the past few years; in 1925 his paper on this work won the annual prize of the American Association for the Advancement of Science. This continued ability to obtain the same results over a period of years, whether the apparatus is at normal level in Cleveland or on a California mountain, makes Dr. Miller's results all the more important.

Nor does Dr. Miller feel that his experiments repudiate the famous Michelson-Morley experiments on ether-drift performed in 1887. This historic test was taken to prove that there is no ether-drift, that there is no "something" filling all space, and it was upon this interpretation that Prof. Albert Einstein based his special theory of relativity when he enunciated it in 1905. But Dr. Miller, studying the results of his latest experiments performed this year on the campus of the Case School of Applied Science, only about three hundred feet from the location of the original Michelson-Morley interferometer of 1887, finds that his results, showing the solar system moving through space, "fully agree with and confirm the original Michelson-Morley observations, although the present interpretation is different."

SMOKE CONTROL MAY NOT SAVE ULTRA-VIOLET LIGHT

Loss of health-giving ultra-violet light in cities is an important problem which present methods of smoke control do not solve. Using a new method of measurement, scientists have measured the amount of ultra-violet light in the atmosphere of Chicago at street level, at various points in the city, and compared it with similar measurements made in the near-by country. Some measurements were also made from the top of one of the city's buildings. The readings were made simultaneously at the "clear points" and at the points within the city. The study was carried out over a period of more than two years, readings being made twice or more monthly. Much of the ultra-violet light available at the clear points was lost at all the urban points tested at all seasons of the year, the investigators found. From a health standpoint, the most serious observing effects were observed in the late fall and early spring months.

COLOR BLIND CAN NOW SEE COLORS

The invention of a new type of spectacles by Professor Franz Weidert, of Berlin, will enable those afflicted with color blindness to differentiate between colors almost as well as though their eyes were normal. Dr. E. E. Free, writing in the *New York World*, describes the new glasses, which, by absorbing some of the colors from light rays of mixed color or of white light, enable the wearers to detect the differences. The glasses increase the contrast between colors.

AMERICAN SCIENTISTS ATTACK EINSTEIN THEORY

At a recent meeting of the Optical Society of America, five eminent scientists — Professor Charles Lane Poor of Columbia University, Dr. Edwin Burns, of the Allegheny Observatory, Dr. R. H. Morgan of the United States Naval Observatory, Dr. W. F. G. Swann of the Bartol Research Foundation, and Dr. Dayton C. Miller—discussed the Einstein theories at great length; the symposium taking the form of a concerted attack upon the propositions of the German physicist.

Professor Poor sustained the Newtonian theories of light as against those of Einstein. Although the adherents of the famous German advance as proof of his theories the fact that rays of light are bent as they approach the sun, the Americans asserted that the same proofs may be used another way, to discredit the theories. According to Professor Poor, there are deflections of light away from the sun, which Einstein neglected to mention. He attacked the hypothesis of the Berlin savant on the ground that, with selected demonstrations, one can prove anything.

In support of Professor Poor the other scientists, with the exception of Dr. Swann, advanced arguments similar to those advanced by the Columbia man. Dr. Swann defended Einstein against the attacks of the Newtonians, asserting that he has given to the world a theory which has been proved again and again.

RADIO-TELEVISION

RADIO CHECK ON BIRDS

Radio has been used to trace the southward flight of birds in winter. Professor Johannes Thienemann, working at a bird-station in East Prussia, was able to check up on the movements of a group of storks. He attached numbered bands to their legs at the beginning of the fall migratory season, last year, and kept himself informed of their movements by means of the microphone.

Members of his radio audience sent him band numbers showing that five days after the birds had departed from East Prussia, they were in the Carpathian mountains of Czechoslovakia. Ten days later they were in the southwest of Greece, having flown approximately 1250 miles due south in two weeks.

MUSIC TRANSMITTED ON BEAM OF LIGHT

Before a meeting of the New York Electrical Society, John Bellamy Taylor, of the General Electric Company, demonstrated the transmission of music along a beam of light, and displayed other phenomena of the photoelectric cell.

A photographic pick-up device was used for feeding musical vibrations into a small beam of pink light, which was produced in one corner of a large auditorium. Then the beam shot across the room to a mirror in the rear; from which it was reflected to a parabolic mirror two feet in diameter in the center of the stage where the experiment was being performed. The mirror served to concentrate the beam upon a photoelectric cell, which fed the resultant variations in current strength into an amplifier and loudspeaker.

When the human body is placed before the light beam, or even when a piece of paper is used to obstruct the path of the light, the music ceases.

Mr Taylor displayed other properties of the photoelectric cell. Using the "sound-band" of a talking film, he projected it at twice normal speed into the photoelectric cell, and the result was a sound similar to a phonograph record which has been speeded up. As the voice was heard the sound waves were seen passing rapidly across a screen. By reversing the direction of the film, Mr. Taylor obtained a jabber of sound, incomprehensible to anyone.

The photoelectric cell was shown to have other properties; it served to cause a match lighted near it to sound like Niagara. An alternating-current bulb was made to sound like a fog horn.

The visible projection of sound-waves may be of some value in teaching the deaf to speak.

NEW DISCOVERY IMPROVES RADIO TUBES

Dr. Irving Langmuir, associate director of research for the General Electric Company, has made known the electric properties of films of gas on the surface of tungsten filaments at low pressures and high temperatures, according to the *New York Times*.

The scientist has discovered that a film of oxygen of atomic thickness is more strongly attached to the tungsten filament than are oxygen atoms in molecular form. He has found, also, that a film of oxygen coated upon caesium produced a ten-thousand fold increase in the electronic emission from a tungsten wire. It is this discovery which has improved radio vacuum tubes.

TRANSMIT RADIO PICTURES TO PLANE

The transmission of radio pictures to a plane in motion has been successfully accomplished by the Lufthansa organization, of Germany, according to *The New York Times*. Using a regular radio transmitting station, the engineers sent a weather chart to a pilot who was flying into a storm area. On another occasion, the position of a heavy thunderstorm was reported in the same way; the pilot by the use of the chart being able to determine the rate of movement of the storm and thus find his way around it. In a third test, the photograph of an airport which had become unsafe for landing, because of floods, was successfully transmitted by radio.

INSTANTANEOUS TRANSLATION OF LANGUAGES FOR DELEGATES

When the delegates to the International Advertising Association met in Berlin this year to listen to speeches by the various officials they did not need to wait until the end of a speech to have it translated into their own language. For by a new device installed in each seat of the convention hall through the courtesy of Edward A. Filene, Boston merchant, the speeches were translated into the language of the delegates as the speaker went on. The delegates were seated according to their nation. Each delegate had a pair of headphones. A translator, one for each language, followed the speeches and translated them into the language of his group, giving the words of the speaker through the circuit connected to the headphones.

GENERAL

OCEAN CONTAINS 94½ BILLION TONS OF SOLID MATTER

Sea water contains 1,500 tons of solid matter per cubic mile and, since the waters of the deep sea cover 115,000,000 square miles to an average depth of two miles, they must contain about 345,000,000,000 tons of solid matter in suspension, says Prof. W. H. Twenhofel of the University of Wisconsin. The deposits of this sediment under the deep sea are very much deeper than geologists in the past have thought they were. There is an annual deposit of 20 tons of mineral matter over each square mile of ocean basin. This means if current estimates of geologic time are correct, that the total deposit reaches the stupendous sum of 90,000,000 cubic miles.

Some of this solid matter is contributed to the sea by the atmosphere, in the form of dust. The dust-fall from the atmosphere in Europe amounts to 266 tons per square mile each year; and this falls on the sea as well as the land.

Another important contribution to the sediment at the sea bottom is from calcareous organisms which live and die in the sea. There is also a great deal of material of volcanic origin.

NEW PIANO SOUNDS LIKE HUMAN VOICE

A new type of piano, which is called a revolutionary musical development, has just been patented by Dr. John Hays Hammond, Jr. The invention increases the sonority of the piano, protracts the vibrations and sustains the capacity and volume of the tone. Often the pianist has desired to influence the tone of the piano after the keys are struck. With the new instrument it is possible to do this and to produce a *vibrato* tone which previously could be produced only by the human voice or by string instruments. The new instrument looks very much like the usual piano, except that the strings are enclosed in a sound-tight casing having two sets of shutters (one above the strings and the other below the sounding board) which are opened and closed by means of a fourth pedal. The shutters act as reflectors and produce an effect called "acoustic regeneration," sustaining the sound vibrations for a much longer time than is possible in the ordinary piano. Manipulation of the extra pedal removes inflexibility and shortness, the chief drawback of the old piano tone. The tone effects and shading made possible have caused the instrument to be called a "breathing piano."

DR. SLOSSON, NOTED SCIENCE WRITER, DIES

Dr. Edwin E. Slosson, director of Science Service, widely known as chemist, writer and lecturer, died recently. He had been suffering from cardiac trouble for some time, and an acute attack hastened his end.

Dr. Slosson, who was born in Albany, Kansas, in 1865, attended the University of Kansas and, when he graduated, was elected to both Phi Beta Kappa and Sigma Xi. In 1891 he went to the University of Wyoming to take charge of the department of chemistry, and he also conducted chemical research for the Wyoming agricultural experiment station. He married Dr. May Preston, the first woman who ever received a Ph.D. degree from Cornell University.

He was noted as a writer of numerous little essays on scientific subjects, which because of their happy style and lucid presentation of ideas in ordinary English rapidly won him a wide audience. In 1903 he was invited to become literary editor of *The Independent*, a position which he held until 1921 when he was asked to become director of Science Service, then newly organized as an agency for the dissemination of popular knowledge about scientific subjects. He held this latter post until his death.

The most successful of Dr. Slosson's books has been "Creative Chemistry", which for a decade has held its own among the best sellers. Among his other works are "Easy Lessons in Einstein", "Science Remaking the World", "Keeping Up With Science", "Chats on Science", "Sermons of a Chemist", "Great American Universities", "Plots and Personalities", "The Spirit of American Education", and "Six Major Prophets".

110-STORY SKYSCRAPER IS PROJECTED

A gigantic building, twice as high as the Woolworth tower, pointing 1600 feet into the air, is being considered for New York by the Noyes-Schultz interests. The structure will in every way fulfill the prophecies of those who have heralded super-skyscrapers.

When it is realized that the proposed office building will tower more than a quarter of a mile into the air, it will be seen at once how tremendous a stride man has made in his conquest of physical obstacles. Larger by far than the greatest ships afloat, the building, which will cost more than $75,000,000, will at the same time provide an airplane landing field of an acre on its roof. It seems as though the dreamers of the future will at last see a realization of their prophecies.

CHANCES FOR LONG MARRIED LIFE COMPUTED

Your chances of both marrying and dying within five years are seven in one thousand, if you are a bachelor of 25 years, statisticians of the Metropolitan Life Insurance Co. have computed. But your chances of marrying and dying in twenty years are seven in a hundred. Similarly, a single woman of 25 years has seven chances in a thousand of marrying and dying within five years; but she has over six in a hundred of marrying and dying within 20 years.

A girl of 15 has the same chance of marrying and dying within five and one-half years as a woman of 35. This is because the girl has a much greater chance of marrying but a considerably smaller chance of dying within the specified period than the older woman.

METROPOLISES OF ANCIENT ARCTIC EXCAVATED

New evidence of man's prehistoric life in the Arctic has been dug out of the frozen ruins of a very large Eskimo settlement on St. Lawrence Island in Behring Sea. St. Lawrence Island and the Diomede Islands, in Behring Strait, may be called the metropolises of the prehistoric Arctic. At these two points the people who lived in the north many centuries ago were especially interested in making their everyday possessions and ceremonial objects beautiful with fine carving. Here too, ceremonials, the foundation of the social life, flourished most; judging by the quantities of carved ivory objects found.

The investigators unearthed ivory and bone harpoons, meat picks, and many strangely-shaped carved objects which have no conceivable use today. Holes bored in some of these, and the various shapes, suggest possible use as cups for ceremonial wands, charms, and personal ornaments; but not even the Eskimos who occupy the same region today and live under somewhat similar conditions can help solve the prehistoric ivory puzzles. There are no such things in the modern Eskimo household.

Science Questions and Answers

THIS department is conducted for the benefit of readers who have pertinent queries on modern scientific discoveries and on established scientific facts. As space is limited we cannot undertake to answer more than three questions for each letter. The flood of correspondence received makes it impractical, also to print answers as soon as we receive questions. However, questions of general interest will receive careful attention. If you desire individual answers to your queries, enclose 25c in postage to cover them and mailing.

A Question in Mechanics

Editor, Science Questions and Answers:

I would like to ask several questions.

1. What is smoke?

2. Do all the known other waves come from the sun?

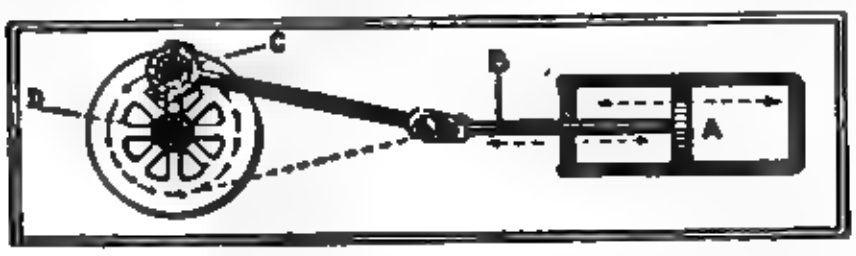
3. Can a rod going from side to side in an absolutely straight line turn a wheel? If so, what is the simplest way to do this?

Edward Lindstrom,
Stapleton, Long Island.

(1. Smoke is solid matter in a very finely-divided condition, carried by the gases and hot air produced by combustion; it is, with ordinary fuels, largely carbon which failed to be burned. A smoky chimney, therefore, is a sign of waste.

2. We are less sure of the existence of "ether" and consequently of "other waves", than we were a few years ago. The electromagnetic waves, formerly supposed to be waves in the ether, which come to us from the sun, come also from other stars, and may be artificially produced, as in the case of light. Also, we produce low-frequency or radio waves; but we have no evidence that any are sent out to us by the sun.

3. The method by which the rod traveling in a straight line can turn a wheel is given in the accompanying diagram. The piston A forces the rod B back and forth; and the rod, fastened at its outer end with the connecting rod terminating at C, forces the wheel on axis D to rotate. A moves back and forth in the direction of the arrows. All that is necessary in addition is to have some force which will push piston A back and forth in the chamber. Steam is an example of this force.—EDITOR.)



Illustrating how a rod moving in a straight line can turn a wheel

Splitting the Hydrogen Atom

Editor, Science Questions and Answers:

There was an article in the paper which stated that Prof. H. E. Bonhoefer, of the Kaiser Wilhelm University, Berlin, split a hydrogen atom into two gases, para- and ortho-hydrogen. Please explain that in greater detail. I don't see how it was done. It is acknowledged that a hydrogen atom has one proton and one electron. How, then, could the atom be split? I don't see any possible way to remove the electron without causing a disruption that would threaten the universe.

William M. Bernstein
New York, N. Y.

(Strictly speaking, the hydrogen atom has never been split. What has been found, however, is that hydrogen is a mixture of two distinct substances. The experiment proving this is simple. Ordinary liquefied hydrogen was used as a bath around a glass tube containing gas-mask charcoal. The liquid hydrogen bubbled and frothed, the charcoal becoming colder and colder. Then some hydrogen was passed through the super-cooled tube of charcoal, and fluid "parahydrogen", one of the forms of hydrogen, was the result. This differs from ordinary, or "orthohydrogen."—EDITOR.)

New Thoughts in Space Flying

Editor, Science Questions and Answers:

The articles by Capt. Nourdung, I read with considerable interest. But there are many things in them I do not understand. Here is a sentence I do not get: "Within the realm of the sun, therefore, we must move around the latter in some sort of free orbit, if we are not to become subject to its gravity and plunge into its sea of fire."

The writer seems, here, to refer to gravity as something which reaches out and grabs you unawares—as something which is all-powerful. The sun's gravity is not *infinite;* why cannot we, by means of our propulsion device, overcome the gravity of the sun? Then we could go in any path we wanted.

To show the comparatively small sun-pull, take, for example, the attraction upon a 150-pound man at 50,000,000 miles from the sun—or well within the orbit of Venus. At the surface of our sun, the attraction is 150x28 or 4,200 pounds. Since gravitation varies inversely as the square of the distance from the center of any mass, the sun-weight of our man would be:

$$\frac{4{,}200 \times 432{,}000 \times 432{,}000}{50{,}000{,}000 \times 50{,}000{,}000}$$

or 0.314 pounds.

If our man is unable to exert a force of 0.2% of his own earth-weight, I don't grant that he would be able to space-fly at all.

Another thing I don't understand about space flying, is the necessity for such enormous initial velocity. Why can't I depart from the earth at any velocity I wish? The earth pulls me with a certain finite force. If I (1) overcome this force, and (2) provide an extra force to give myself an acceleration, it seems I could leave the earth behind, even though I might be going very slowly at first. An "extra force" of but six pounds fourteen ounces would lift our 150-pound man from the surface of the earth half-way to the moon in a little over eight hours:

$$F = Ma$$

$$6.875 = \frac{150 \times a}{32}$$

$$a = \frac{6.875}{150} \times 32 = 1.466\tfrac{2}{3} \text{ ft./sec./sec.} = \frac{1}{1000 \text{ mi.}}$$

$$t = \sqrt{\frac{2s}{a}} = \sqrt{\frac{\text{mi./sec./sec.}}{\frac{2 \times 120{,}000}{1}}} = 12{,}000\sqrt{6} =$$

$$\frac{1}{1{,}000}$$

29,400 seconds = 8 hrs., 10 min.

The velocity of the "man," at this time, would be 3 1/6 miles per second.——It looks easy, but try and do it.

Felix D. Wadel,
Box 146, Tyler, Texas.

(The deduction that Mr. Wadel makes, that a man provided with a means of continuous propulsion could escape the gravitational pull of the sun is correct. By merely having a pistol which he discharges in the direction of the sun he could undoubtedly provide enough force to keep him from it. But his force must be applied continuously, for gravitation is always at work. Nourdung's statement is rather a general one and is meant to apply in absence of such a propulsion device. In other words, the only force which is constant and which can overcome gravity in the centrifugal force that a body would have in revolving in a fixed orbit about the sun.

There is no fault to be found with the theoretical analysis Mr. Wadel makes of the force required to lift a 150-pound man from the earth. But there are some practical elements to be considered when making a trip in a space ship. In the first place, the space ship must itself be lifted; and such a ship would undoubtedly weigh 16,000 times 150 pounds. In the second place, a great acceleration is necessary in order to escape the pull of gravity as quickly as possible.

Since the force required to merely neutralize gravity is 150 pounds, by adding 6 pounds and 14 ounces as Mr. Wadel suggests, an acceleration upward of 1.46 feet per second (per second) is obtained. This requires a total force of 156 pounds 14 ounces. Now, if 300 pounds were used, the acceleration upward would be 32.16 feet per second per second. In other words, by not quite doubling the upward force, the acceleration is multiplied by almost 22 (32.16/1.46). Thus it would seem very foolish to use only 156 pounds as Mr. Wadel suggests. The limit to the acceleration is governed, not by what engineers deem technically possible, but by what the human body can stand.—EDITOR.

Motion Without Gravity

Editor, Science Questions and Answers:

I have read many stories on gravity, but there are a few questions I would like to ask.

If gravity is stronger than centrifugal force, as I understand it is, isn't it possible to overcome centrifugal force when gravity is overcome? Overcoming gravity means to take the weight off anything, and what has no weight will not fly.

Fred Bolte,
Detroit, Michigan.

(We do not understand quite what is meant by the statement that "gravity is stronger than centrifugal force". It is possible to have gravitational force of almost any value, depending on the masses of the objects concerned and their closeness to each other. It is possible also to have centrifugal force possessed by a body in any amount, depending on the mass of the object and its velocity in a curved path. If a body is moving around another in a closed curve like the earth about the sun, it means that the gravitational force of the sun is just balanced by the centrifugal force of the earth's motion.

Now, if all gravitational force were removed, the earth would fly out of its orbit on a tangent to its path; for it is only the gravitational force of the sun that has held it to its orbit. The same is true of rotating a ball at the end of a string: If the string is suddenly cut the ball will fly off.

The reason that the ball (or earth) would still continue to move is that it has inertia by means of its mass and motion; and one of Newton's famous laws of motion is that a body will continue moving until its motion is opposed by another force.

Our correspondent confuses weight, which depends on gravitation, and motion which depends on the inertia of a body and is independent of weight and gravitation.—EDITOR.)

(Continued on Page 735)

The Reader Speaks

IN this department we shall publish every month your opinions. After all, this is *your* magazine and it is edited for you. If we fall down on the choice of our stories, or if the editorial board slips up occasionally, it is up to you to voice your opinion. It makes no difference whether your letter is complimentary, critical, or whether it contains a good old-fashioned brickbat. All are equally welcome. All of your letters, as much as space will allow, will be published here for the benefit of all. Due to the large influx of mail, no communications to this department are answered individually unless 25c in stamps to cover time and postage is remitted.

"Into the Subconscious" Disgusting

Editor, Science Wonder Stories:

I am sorry to say that the October issue is the first issue of Science Wonder Stories I would not be willing to recommend to anybody.

"The Metal World" was interesting.

"The Ancient Brain" is the driest story I have ever read. There is no action and, so far as I can see, little real science. The author has the hero act as if it were the most ordinary thing in the world to be killed and to come to your senses ten thousand years later inside of another man's body. Then he goes through the ordinary form of being examined, getting a position and falling in love. I don't see how you could have chosen such a dumb story. I doubt if Mr. Stanghod has written five stories in his life.

The second part of the "Human Termites" was certainly good. In fact, it was about the only thing in the magazine that was.

"Into the Subconscious" was disgusting. I suppose your picture of the God who led the Hebrews out of Egypt looked like a frog, chicken, goat or ox.

In Genesis, God said: "Let us make man in our image, after our likeness. So God created man in His own image."

Now some men come out and say that in a myth, that man came from a common ancestor of the monkeys.

They deny the story of the creation or say it was six long periods of time. Their theory is that some dust in the air got stuck together. More joined with it. After eight or nine billion years it had about a hundred cubic centimeters. About that time a piece of dirt became an insect. Years passed. The earth became bigger and so did the insect until it became an ox. As the earth grew, the ox may have become a rabbit, or did the rabbit come in a space flyer from Mars and bring with it a few bugs and mice, eh? The years still passed. Something or other, maybe a stone wall, gave birth to a monkey and a man. As the years passed both grew to the state they are now in. Ouch, yes, but it holds much better than some other theories the evolutionist has devised.

So stuffed is the hawk in its flying that it can sail the length of the Holy Land many times in a day. So delicately adjusted is the bird's flying apparatus that, if the primary feathers are lost from the tip of one wing, the power of flight is seriously crippled. I suppose some people would say that bird is a cousin to the mud turtle. "Surely, it is not by man's wisdom, nor by evolution, that the bird is able to fly, but by the power of Him who in the spiritual world can teach us to soar to heavenly heights, leaving below us everything mean and low, every wickedness, with every unlovely thought or deed." Many stories like this and I am sure you will be deserted by a large circle of readers.

"Eros to Earth" was good but *Mr. Ransley* is generally better.

"In Two Worlds" was good.

The rest of the magazine was very good.

One of your readers says he does not like serials because they are continued at an interesting point. It seems to me you are always kind enough to pick out the dullest point to end the installment. He should have noticed [illegible]

Curtis Taylor,
103 Grove Place, Utica, N. Y.

(It does not come within the province of Science Wonder Stories to argue either for or against religious issues in any phase.

But when it comes to evolution, this is a question of science and, as such, it becomes our duty to discuss it in the light of the latest knowledge. As a scientific magazine, we are naturally pro-evolution; for we uphold all the truths that science discovers, and believe they should be published. The matter of religion does not enter into this at all. When, for instance, Luther Burbank became a creator of no mean ability, he speeded up evolution in a most remarkable degree, perhaps more so than any other man who ever lived. It was possible for Burbank to evolve the spineless cactus, the seedless grape, and an infinite variety of other fruits and plants in a generation, where it might have taken nature thousands of years. In this particular instance, it would be silly to argue against evolution. Burbank showed how possible it is to cross-breed and to evolve entirely new species that were not found on earth before. Similarly, in the biological laboratories, scientists are now evolving new types of insects and animals, many of which had not existed before. To mention only one instance, scientists recently found it possible to hasten the evolution of certain fruit flies to such an extent that entirely new characteristics of the species were evolved. Even when it comes to human beings, evolution is constantly going on. Only as recently as fifty years ago, when a human monstrosity known as the cretin was brought into the world, the child usually remained a hopeless idiot. By means of glandular treatment today it is possible to evolve from it a normal human being.

But the one great trouble with the anti-evolutionist is that he refuses to consider how slowly evolution works, and that a cycle of a million years is ridiculously small when we contemplate the vastness of time. In the scientists' laboratories, only one essential for speedy evolution, so far as mammals and the higher type of animal are concerned, is missing. That essential is time.

In the meantime, science keeps on heaping proofs upon proofs; and the time will come when the anti-evolutionist will be relegated to the class of those individuals who still insist that the earth stands still and that the sun revolves around it.—*Editor*)

Science and the Average Man

Editor, Science Wonder Stories:

Your new "Science Questions and Answers" column is great! Frankly speaking I was against the idea at first, but after reading some of the questions and answers I have acquired a new source of information and general enlightenment on scientific subjects.

I know the following statement for a fact and I imagine that there are more cases of this kind.

I know of several friends of mine who, before I introduced them to *your* magazine, never had any interest in science nor any inkling of its true nature and great benefit to mankind. It is true that they may have had a year or so of science in school but they did not take the right attitude toward it. Science was simply a bad pill for them and had to be swallowed in as short a time as possible. They were plainly bored by the text book methods of school. And so it was left for you to awaken them to the wonders of Science; to its real meaning, and the glamour and romance of it!

And so in the name of my friends and myself I thank you for the very happy moments you have brought us.

Joseph Fox
3620 S. Beulah St.,
Philadelphia, Penna.

(Mr. Fox presents the feelings of a great many of our readers. It is the object of this magazine, not only to entertain but stimulate, and instruct. If we have succeeded in making science more attractive to the average man, we have accomplished one of our purposes.—*Editor*).

Monstrosities on Other Planets

Editor, Science Wonder Stories:

Having been a reader of various scientific fiction magazines for several years, and more especially of Science Wonder Stories since its inception, I feel constrained to remark that although your magazine might be improved in some respects, my quarrel is with its contributors rather than with the editors.

Tales of interplanetary travel seem to me to be great favorites, but why authors persist in making these imaginary voyages of a militant nature is rather obscure. When the day of the space ship shall have arrived, I do not conceive of an expedition embarking upon a voyage of conquest or annihilation to this or other planets of the solar system. Rather do I see learned men of an alien race, with their scientific equipment, departing upon long journeys of discovery and exploration. Or, in later days, luxurious space fleets carrying their human cargo to colonize the new world, or ponderous freighters plying the far reaches of the universe.

Some of the grotesque monstrosities depicted by authors as inhabitants of other planets are so absurd as to be almost childish. Of the countless millions of "stars" which dot the firmament, it is inconceivable that our own comparatively tiny world is the only one containing intelligent life, and to associate a high order of intelligence with such nightmares as some authors portray is the height of inconsistency.

A field rarely touched by writers of scientific fiction is that of weather control. A scientist who has become a fanatic over his hobby acquires a grievance—either real or fancied—against his government, and dictates terms. If the government does not capitulate within a specified time, a series of violent and destructive storms will sweep designated sections of the country on certain dates. The storms arrive with great violence, as per schedule, and the government prepares to combat the would-be dictator. The country is then overwhelmed with unseasonable and piercing cold while unprecedented floods are at their height. Louis Tucker, one of your most able contributors, could produce in "The Storm King" a story of super-excellence.

Howard Leroy
Bowata, Oklahoma

(Mr. Leroy's points are well made. Regarding expeditions to other planets, or expeditions from other planets to this one, it must be acknowledged, that, while there are a number of men devoted to science in the abstract there are a great many devoted to science simply for the pecuniary rewards that such devotion will bring. The commercial urge in most men—the result of the acquisitive instinct—would bring about a commercial exploitation of other worlds, if that were possible.

As to life on other planets, we have never denied that it existed. Since we know, however, that weather and atmospheric and solar conditions are different than they are on the earth, we have a logical right to assume that the forms of life must be different. If the inhabitants of other planets appear to us as monstrosities, we would appear as monstrosities to the inhabitants of the other worlds in space. Your remarks on the supposed weather king are answered by a story in Air Wonder Stories (January issue) called "The Thunderer".—*Editor*)

(Continued on Page 757)

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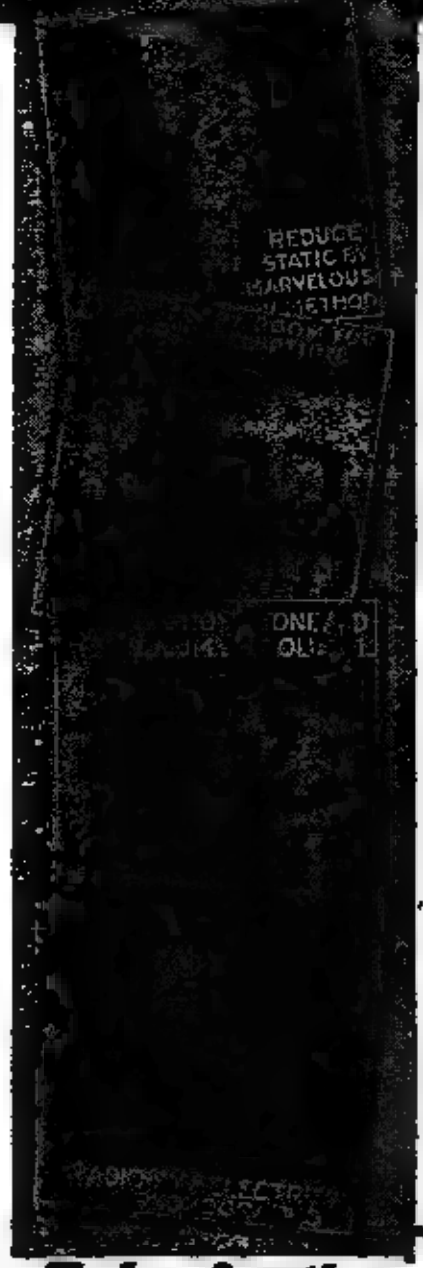

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FUNDAMENTAL ERROR CONTEST
Prize Letters
(*Continued from Page 746*)

If this frog had been devoured by the reptile, then Sam would not be here to reveal the scene for, upon his death, his mind, both conscious and subconscious, would have perished with his body.

The theory of the story is that memories of the subconscious mind are passed from one generation to another. Then, this frog would have had to have lived after being eaten by the reptile and become the parent of another creature before these memories could be carried up to the present time (which is an impossibility) of Sam's existence.

Possibly Dr. Macey made a mistake in assuming that the frog died then and there. Just as the reptile was opening his mouth to eat the frog one of the reptile's enemies might suddenly have pounced upon it, thereby drawing the hypnotic gaze from the frog and allowing it to escape.

Bruce Burnett
Eldorado, Ill.

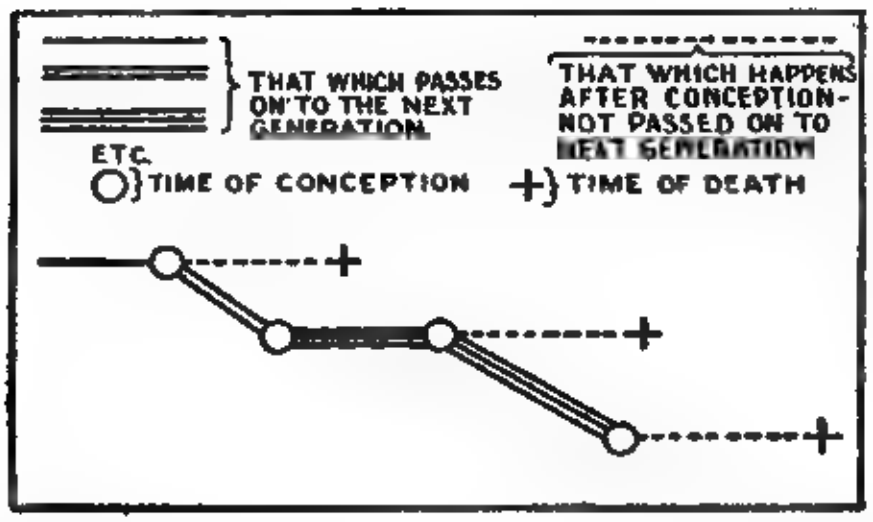
HONORABLE MENTION
Could Not Follow His Father's Mind

Editor, Fundamental Error Contest—

After reading "Into the Subconscious" I found two about equal mistakes.

First, I will recall where the home grows newer, the trees smaller until they vanish and it is an uninhabited country. Next he goes back to Prehistoric Age. The figure is first fishing in the water and other *incidents* happen until he is seated by the fireside in the cave. From there on, the scenes should go backwards. They should start at the fireside and go *back* to the fishing the river. In case you do not catch what I mean I will give you an example. If you run a motion picture backwards (reverse the motor in the projector).

The next mistake is: I do not see how this Sam could witness his ancestor's father's death. After his ancestor was born I do not see how he could follow his father's mind with things that happened after his own birth. This is shown by the accompanying diagram.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Arthur Y. Troutman, Jr.
Box 7,
N. Pleasanton, Tex.

HONORABLE MENTION
A Million Generations

Editor, Fundamental Error Contest—

Granting the doubtful hypothesis that: *the subconscious mind contains memories of existences prior to the one in the present body;* had the cells comprising Sam's subconscious mind lived through the *entire life* of each of his forebears? If so, he would remember the deaths of each of his ancestors. However, these cells were passed to Sam by germination, then birth. *He would not be able to remember anything that happened to either parent after the female had been impregnated.* Therefore, he would not remember the death of an ancestor—an event that could not posibly have occurred before germination. In other words, the cells that made up Sam's subconscious mind could never have experienced death, and no death struggles could be registered.

Does Mr. Myers imply that Sam had but one life in each generation, say, that of his father, his father's father, and so on back lineally? Again from our hypothesis, if Sam's subconscious mind recalled one life, it would remember them all; hence in the generation prior, he could recall the lives of two people—his father and mother—and in the generation before, of four people—two grandfathers and two grandmothers. A million generations back, Sam would have 2-to-the-999,999th power lives to choose from! In the million and first generation ago, Sam was (theoretically) part of 2-to-the-1,000,000th power organisms. So many existences would become hopelessly confused, even in the subconscious mind, and Sam's ability to choose *the* completely satisfying life is inconceivable.

Llewellyn Wiley
Bradley Polytechnic
Institute, Peoria, Illinois.

HONORABLE MENTION
The Mind Leaps Back

Editor, Fundamental Error Contest—

If yawning jaws had closed over Sam's diffident, frog prototype in Ray Meyer's "Into the Subconscious" they must have interfered seriously with his propagation of descendants and the mental image of his prehistoric destroyer would necessarily be hard put for reproduction to prove Doctor Macey's theory; for descendants were the only possible links between that past and Dr. Macey's present.

In Darwin's "Origin of Species" one of his proofs of human evolution connecting the past with the present is that most people have experienced realistic dreams in which they fall into black, terrifying depths. Darwin deduces from these dreams that the subconscious mind has leaped back to the age of tree dwelling and that some remote kin hae lost his or her balance from a limb and fallen. At this stage of the dream the dreamer invariably awakens or alights safely (in the dream) as in water. If he or she had failed to retain life, back in the past, that sensation of falling would have died with the faller, as no children could have inherited that sensation.

Summed up, then, the experiment performed by the Doctor could not have been so successful had those jaws closed and killed, so either the Doctor erred in his conclusions in this respect or Sam's frog ancestor possessed female characteristics and by some means at that time left behind an offspring who possibly could have retained the subconscious memory of wide, open jaws and hypnotic orbs.

Elmer Lincoln
C/o Oregon State College
Corvallis, Oregon

HONORABLE MENTION
An Unbroken Chain

Editor, Fundamental Error Contest—

After reading the story "Into the Subconscious" I was so forcibly struck by one error that I had decided to write even before I saw the contest notice. Here it is.

Admitted the mechanical details are within the wide realms of probability, there is still an error. Impressions from an ancestor would be, in brief, a record of his life from conception to the conception of the next in line; the chain running from generation to generation in this manner. The point is that the individual's memory ends at the conception of his successor, and not with death.

Therefore there can be no death memory in the chain, since natural conception or fertilization is impossible after death. There may be memories of injuries, but of death, no. Therein lies the flaw.

Edward F. Kumpe.
U. S. M. A.
West Point, N. Y.

HONORABLE MENTION
With All His Instruments and Powers

Editor, Fundamental Error Contest—

I believe that I have discovered the impossibility contained in the story, "Into the Subconscious," by Ray Avery Myers. Here is the way I figure it:

Granting that everyone retains in his subconscious mind the experiences of his ancestors, there is a limitation to what it retains. To be more specific, both parents transmit to the subconscious mind of their offspring as much of their lives as have occurred up to the time of fertilization. Such being the case, it is manifestly impossible that anyone could recall from his subconscious mind the death of any of his ancestors; for all the offspring of that ancestor must have come into existence before its death. That is, fertilization must have occurred before death.

Therefore, with all his instruments and hypnotic powers, Dr. Macey could not have drawn from Sam's subconscious mind the memory of his ancestor's death; for the simple reason that there was no such memory in his mind.

Eugene Klawier
411-F Saybrook Apt.
Craft Ave.,
Pittsburgh, Pa.

HONORABLE MENTION
Continues in an Unbroken Series

Editor, Fundamental Error Contest—

My conception of the fundamental error in Mr. Myers' story, "Into the Subconscious", is as follows: According to the author's statements, the subconscious continues in an unbroken series from the earliest life up to the present subject.

Consequently, it is imposible for the subject to have experienced the death of an ancestor, since at the time of the ancestor's death, the subject was an independent entity.

Very truly yours,
C. W. Copeland
728 Kearney Ave.,
Arlington, N. J.

HONORABLE MENTION
Would Have Been No Sam

Editor, Fundamental Error Contest:

The fundamental error was made at the time Sam's ancestor was swallowed by the snake. If that had happened there would have been no Sam in the doctor's laboratory on the night of the experiment.

Thanks for the *only* good fiction magazine.

M. Dosick,
c/o David C. Paris,
127 Homes Ave.,
Dorchester, Mass.

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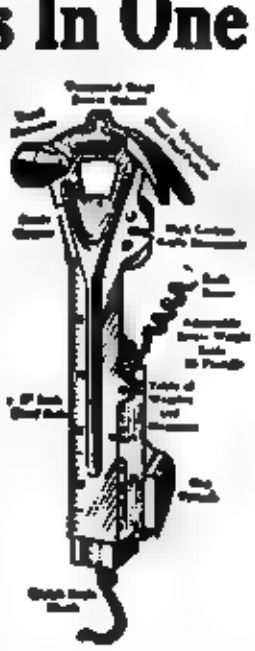

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Science Questions and Answers

(*Continued from Page 751*)

Hydrogen and Oxygen as Fuel

Editor, Science Questions and Answers.

Your section of "Science Questions and Answers" is surely great. It gives people a chance to ask you questions that are a puzzle to many of us and it also gives us a chance to ask you questions which when answered in your magazine (I should say our magazine) would start somebody on a line of thought that would eventually be a blessing to mankind. With that thought in mind I am going to ask you the following questions:

1—Is it possible for us to take hydrogen and oxygen from the air and use it, the same as gasoline, for motor fuel?

2—If it can be done, have you any idea how it would be accomplished?

3—How does the average scientist compare the first chapter of Genesis in the Bible with his own viewpoint of creation?

Fred G. Michel,
Oakland, California.

(1—For all practical purposes, there is no hydrogen in a combustible form in the atmosphere. Oxygen is not in the ordinary sense of the word, a fuel; this point was covered in the answer to Mr. Becker on page 658 of last Month's SCIENCE WONDER STORIES. Oxygen is necessary to combustion but unless it can be obtained directly from the air as it is used, it adds enormously to the weight which must be carried to supply a motor. A pound of hydrogen requires eight pounds of oxygen, or forty of air, to burn it; in addition to this, the weight of the containers must be considered. While liquid, or even frozen, gases need not be kept in tanks under pressure, they must be stored in a temperature several hundred degrees below zero.

2—It is quite possible to ignite a mixture of hydrogen and oxygen by the use of a very powerful "fat" spark, but the idea of using the combination in a combustion engine is impractical, because the explosion cannot be controlled as we can the explosions of gasoline and other fuels.

3—Those scientists who have tried to reconcile science with the events recorded in Genesis have done so by considering each of the six "days" of creation as an entire geological era covering hundreds of thousands of years. About the first act of creation scientists know little more than laymen, and are willing to admit their ignorance. —EDITOR.)

Carbon's Twin

Editor, Science Questions and Answers:

In regard to the chemistry news in the December issue, I would like to know if "Carbon's twin" is an allotropic form.

D. Katz,
417 E. 65th Street,
New York City.

(The new form is not allotropic, but isotopic. It is not carbon in another form (such as a diamond) but it is really a different element. The twins have different atomic weights. — EDITOR.)

Squaring the Circle

Editor, Science Questions and Answers:

I would appreciate it very much if you would please tell me:

1. What is the approximate density of Mars, with relation to the earth?
2. What Einstein means in his theory of the enclosed universe?
3. Is it true that a prominent professor of Montreal has squared the circle?

Balmers Southram,
Nova Scotia, Canada.

(1—Mars, like the earth, is possessed of a crust. It is no longer in the gaseous stage. Its density is about two-thirds that of the earth.

2—Einstein means that the universe is finite, that it has definite limits, and that, although man can never reach these limits, they exist. To him, the universe is curved, like the earth's surface and, though one may go round and round it, the end is never reached.

3—This has not been verified. Any "squaring of the circle" comes under the head of a mathematical trick. The ratio of the side of a square, compared with a circle of the same area, to the diameter of the circle can be expressed mathematically, but not arithmetically, with absolute exactness. However, this ratio has been computed arithmetically beyond the limits of any practical necessity.—EDITOR.)

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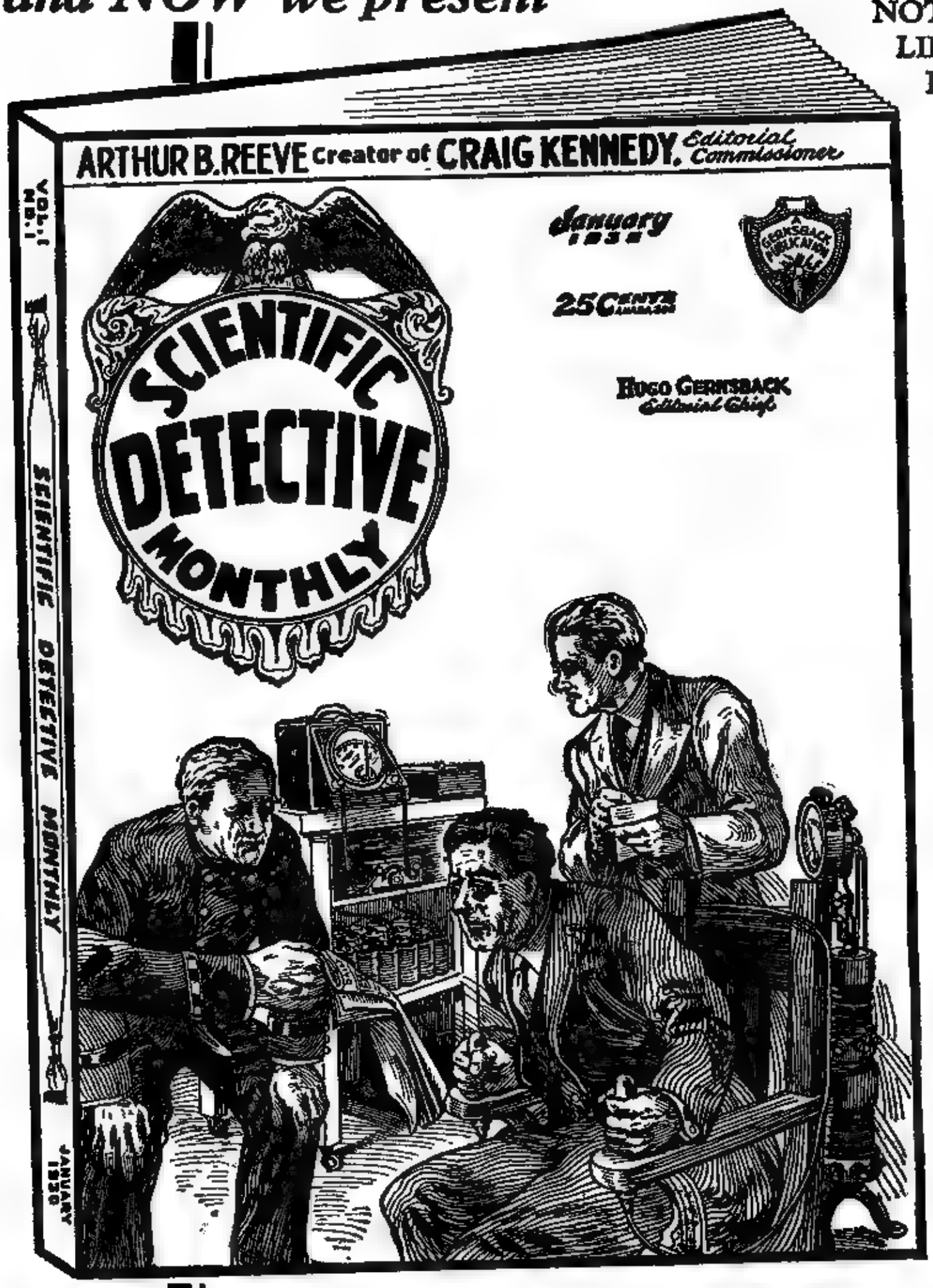

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The Reader Speaks

(Continued from Page 718)

A Subconscious Experience

Editor, Science Wonder Stories:

Concerning "Into the Subconscious" there are many theories and facts which may serve to throw light upon the subject. The following experience will, I think, be of interest.

Observers and students of human nature will admit resemblance and tendency between humanity and the various creatures of the animal kingdom. In some cases this is caused by suggestion during pregnancy.

In certain states of revery I have seen quail, half-grown humans and monkeys.

I often wonder of the possibility of the master "Atom or Electron" of my being living through these small creatures. I shall never say anything against evolution in any respect.

I had a subconscious experience in Juarez, Mexico, on April 11th, 1912. An invisible, external power laid hold of me and turned me around and led me across the floor to a show case and as I laid my hand on said case a scene flashed before me. It was the most familiar scene I ever saw, and while trying to recognize the scene a heavy mellow dramatic voice directly above my head called out the location of the scene. I had never been there before, not since my present physical existence began, September 12th, 1883.

Dark rolling clouds from the west came drifting over, and directly above the scene the clouds shot downward as though they were dynamited. I felt myself go down and slightly rebound. There I was face to face with great buried treasure, buried decades and decades ago. A great pool of oil. Then absolute darkness.

I will leave my feelings to your imagination at this time.

In 1913 I arrived on the scene of my vision. Again I will leave my feelings with your imagination. My subconscious experience occurred without effort or electrical appliances and ended within two minutes.

Doc. Macey, M.D., could not have lived through the long experiment in this story.

With proper equipment I can prove that I was more than 1,000 miles from my body and hundreds of feet below the surface of the earth on the above mentioned date.

Science Wonder Stories are wonderful. They are showing disinterested individuals that they are greater than they know.

Daniel L. Fisher,
331 E. Cambourne Ave.,
Ferndale, Mich.

(The subconscious experience related here is very interesting in view of the theories it serves to illustrate. Man has by no means penetrated into this mysterious realm of thought and desire, and the very fact that such experiences can take place is indicative of the vast possibilities that lie before scientists who choose to make a life-work of the field of the subconscious.—*Editor.*)

Culture and Science in Atlantis

Editor, Science Wonder Stories:

There is one rather large error in "The Time Oscillator," by H. F. Eichhorn. All the scientists seem to be agreed that Atlantis had a high culture, and he gives it a civilization at least two thousand years behind our own with no knowledge of explosives, electricity or medicine and so little of any science that the people are extremely superstitious.

"The Super Velocitor," by S. C. Carpenter, was a very good story. "The Conquerors," by Dr. Keller, promises to be very good, although I cannot see how a blanket of heavy fog could be maintained for a year over a certain area without spreading rather widely outside of that section. I think the magazine is holding up fine. Give us more of Ed Earl Repp if you can.

Thomas G. Morrison,
200 Murray St.,
Binghamton, N. Y.

(The writer of this letter confuses science and culture. Superstition is not always an indication of low culture. All primitive peoples were superstitious. Greece, in the time when such great scientists as Pythagoras, Democritus, and Archimedes worked, was unusually superstitious. And then our conclusions regarding Atlantis are hypothetical. There are few actual remains to substantiate them.

(Continued on Page 758)

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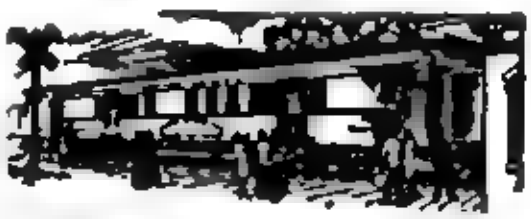

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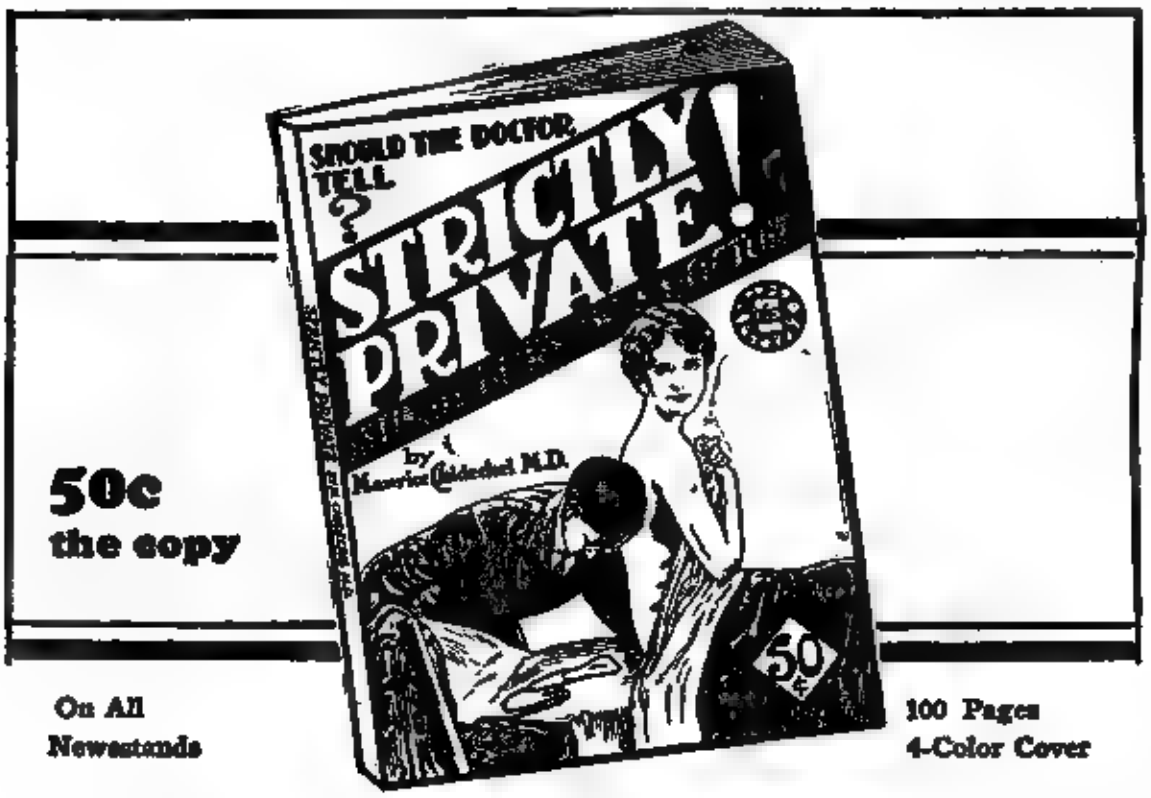

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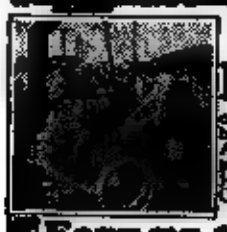

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The Reader Speaks

(*Continued from Page 757*)

The idea of covering a large section of the country with a blanket of heavy fog is scientifically possible and could readily be achieved. It could be done by electrical means. Or, as the author suggested by turning great underground rivers into steam by means of the heat stored within the earth.

While it is, of course, true that fog moves over the earth, this only happens when storm winds prevail. Usually heavy fog is more or less stationary. It can be dispersed by electrical means, and if Dr. Keller's characters were able to create a fog of the intensity and scope that they did, they certainly would also have been able to control it.—*Editor.*)

IF you are a lover of science fiction, you must certainly obtain the January issue of AIR WONDER STORIES, now on all newsstands. This magazine specializes in science fiction in which aviation of the future is featured. You will find here your favorite authors in stories as stimulating and exciting as those in SCIENCE WONDER STORIES.

Contents of the January issue are:

"The Flying Legion"
by George Allan England
"The Storm Buster"
by Ed Earl Repp
"The Airport for World Traffic"
by H. Dominik
"The Death's Head Meteor"
by Neil R. Jones
"The Thunderer"
by A. H. Johnson

Termites of Many Kinds

Editor, Science Wonder Stories:

Allow me to congratulate Mrs. Ammons of Chicago and to say that I am glad to see you printing the addresses again; it's rather embarrassing, you know, to have a letter come back marked, 'Not in the directory.' But to return to the foolish genius; I have often thought that as a science fiction writer he ought to make a fine specialist on some subject he hasn't yet written about. For one thing, he seems not to know that termites are not confined to the tropics; and, for another, he seems to think there is only one type. The tall "ant-hills" are only the most conspicuous dwelling, and even that is not confined to one species, or even genus. The termites threaten man, through his wood supply. On the Pacific slope alone there are some dozen species and one formerly thought harmless was *recently found in living orange trees.* Dr. D. H. Keller's combination of lack of facts and lack of style is lamentable and overpowering; but he may serve a purpose if he draws attention to things he and most of his readers know too little about.

The ending of the "Gold Triumvirate" saved it from being too much of a re-hash to be good. With some new ideas Walter ought to be a good writer. But console yourself, I haven't cancelled my subscription yet; and be sure to tell Paul that as a cover illustrator he's a darn good artist and improving with practice.

Clifton H. Amsbury,
2216 Ward St.,
Berkeley, Calif.

(Dr. Keller is quite aware of the fact that there are termites of many kinds. But, you see, he was writing a story, not preparing an exhaustive treatise on the subject of termites. In a fiction story one should not expect the scope of a work like Forel's "Life of the Ant."

In order to give an arresting and thought-provoking picture of the termite menace, Dr. Keller has selected one type for illustration. Seemingly, in the opinion of the majority of our readers, he has written a splendid and stimulating story of a possibility which is by no means remote.—*Editor.*)

(*Continued on Page 760*)

New Book Club Cuts Price of Month's Leading Books to 42c

By ARTHUR K. WHITLEY

NEVER before in the history of book publishing has there been so wide and varied a deluge of important—really significant—books. A recent list of best-sellers includes such names as Julian Green, Susan Ertz, John Galsworthy, Hugh Walpole. There is no doubt that American readers want good literature, and are willing to read any amount of good books—if they are within reach.

But so many books are published each year that it is almost impossible for the average reader to buy every volume he would like to own. As a result, hundreds of worthwhile volumes are overlooked—due to the "high cost of literature."

Why are books so expensive? Why can they not be sold as cheaply as magazines? This has long been the problem of a group of distinguished writers, educators and publishers.

The Writer said: "The author's earnings do not increase the price of good books. He would much prefer having 50,000 readers purchase his book for 42c a copy than only 5,000 at $2.50."

The Educator said: "Free public education has given the average citizen an appreciation of good books. More fine literature is being read today than ever before."

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And so the writer, educator and publisher conferred with printers, artists, distributors—*and worked out their plan.* The result is: *Paper Books.* This is a wonderful new book club that provides one outstanding volume a month—12 important, notable books a year—for the unheard of price of only 42c a volume! The books average 300 pages and contain as many words in as large type as the average $3 or $4 book.

Thousands upon thousands of readers who never dreamed that fine books, beautifully designed and printed could be sold for only 42c a volume, have already become charter members. After subscribers received their first two selections, "The Golden Wind" by Takashi Ohta and Margaret Sperry, a fascinating novel, and "Frederick the Great" by Margaret Goldsmith, a vivid, *full length* biography—letter after letter came to the Editorial Board expressing amazement that such a publishing feat could have been accomplished.

The New York *Times,* writing of the first Paper Book selection says: "Not only is 'The Golden Wind' remarkable for a most unusual and successful blending of East and West in romantic narrative, but its selection marks it as a portent in American publication. With cover and end-papers designed by Rockwell Kent, it is a distinguished piece of work, compounded of good paper, clear type and well bound."

The newest *Paper Book* selection is "Dewer Rides" by L.A.G. Strong. This novel is creating a sensation in England where it has received greater praise from critics than any other novel in recent years. Selections like these more than justify the original plans of this remarkable new book club. Now everyone can enjoy a whole year's distinguished reading—*for less than the price of two books;* and still have sufficient in their book budget to buy other volumes that may interest them.

Some of the men responsible for this wonderful new publishing innovation are: Padraic Colum, famous author, Everett Dean Martin, distinguished educator, Lincoln Colcord, eminent critic, Louis Untermeyer, oustanding American editor, poet and critic, Horace M. Kallen and Charles Boni.

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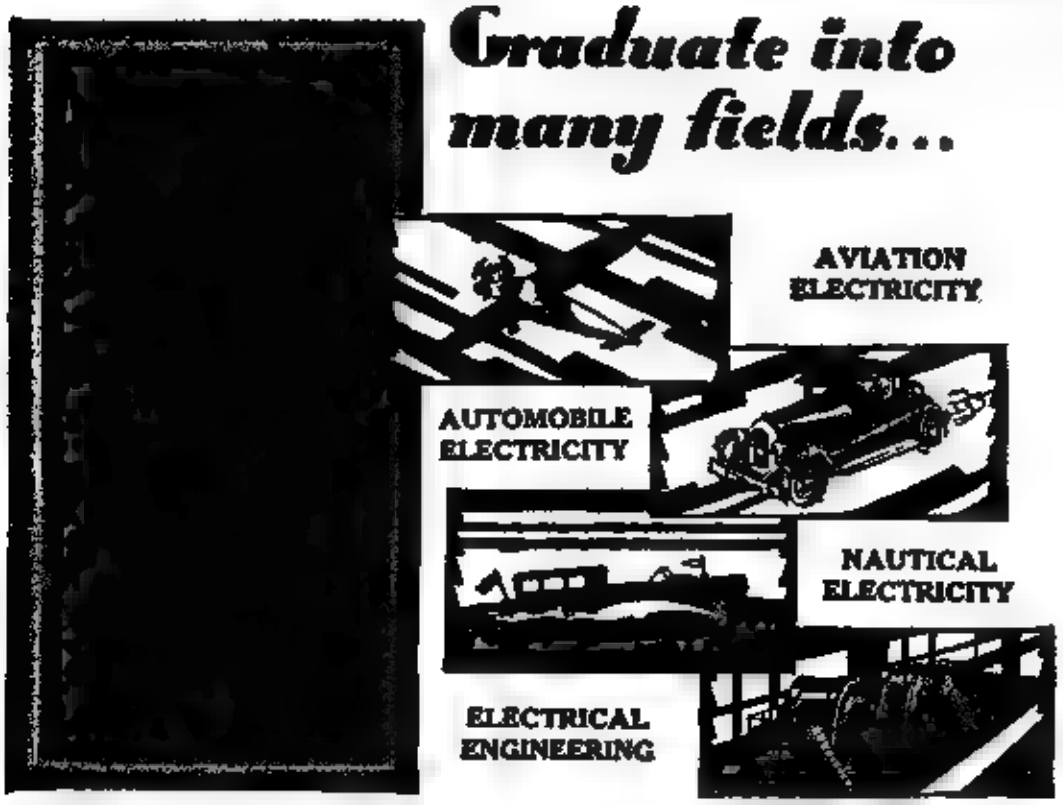

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The Reader Speaks

(*Continued from Page 758*)

Time Traveling Is Impossible

Editor, Science Wonder Stories:

I have just received a copy of the December issue of your magazine, and am now reading "The Time Oscillator," by H. F. Kirkham. I am a great Einstein fan; and, as a result, I have speculated at some length as to the possibility or impossibility of time travelling. I have finally arrived at the conclusion which makes time traveling as told in your stories absolutely impossible. I challenge, therefore, any of your readers or authors to refute the following statement:

Suppose we take an object having three dimensions, such as a pyramid. A point is situated upon the apex of this pyramid. Now let us move the point in any direction, any distance. Immediately upon the point being moved, that point is no longer in the vertex of the pyramid. In other words, no matter how little we move the point, it cannot be in the vertex unless the vertex is made to coincide with the point by moving the whole pyramid. So much for three dimensions. Now, I agree with the others that the assumption of time being the fourth dimension is perfectly plausible and logical. Granted, too, that the earth and its inhabitants exist in at least a four-dimensional world. And now comes the fallacy of the stories.

IF you have not as yet seen the Winter 1930 SCIENCE WONDER QUARTERLY, Watch for the [illegible] Cover!

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by Lilith Lorraine

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by Capt. S. P. Meek, U.S.A.

And Others

Do not miss the second issue on all newsstands December 15

Suppose this earth existing at a given time—say 12:00 P. M. January 1st, 2000 A. D. Suppose, too, that this time, our time traveler goes some seconds or centuries into the past or future. As stated above, this should be possible, but he will not land on the earth, for the simple reason that the earth is not there. Just as when the point was moved from the vertex of the pyramid and it was no longer in the vertex, the man when he moved (in any dimension, as it makes no difference in which one) away from earth he was no longer on the earth.

Let us now take the other hypothesis. Your readers will doubtless remember a story called "The Fourth-Dimensional Cross Section" where a fourth-d[illegible] being of human shape was caused to intersect our earthly three-dimensional sphere. The result was that when his legs appeared they were perceptible as two spheres; when his trunk and arms appeared they were like a large sphere with two smaller spheres on each side; and so on. Suppose now that your earthly world is four-dimensional, the fourth dimension being time. All objects on earth, or nearly all, therefore extend into the past and future. The earth, for instance, instead of being a sphere to our three dimensional perceptions is really an infinitely long cylinder, and similarly for other objects. Our seeming three-dimensional world is therefore but one of the infinite number of sections of a four-dimensional object just as a line is one of the infinite number of sections of a plane. Now the surfaces of all the sections of the earth are covered with sections of objects on the hypothetical cylinder. This principle is somewhat similar to that used in the story called the "Book of Worlds." It would, therefore, be impossible for anyone to travel in time; because he would then have to coincide with one of his own sections existing in the fourth dimension. Now, according to the law

(*Continued on Page 763*)

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The Reader Speaks

(Continued from Page 760)

of Impenetrability, this is impossible. This does not mean that the past and future could never be seen. The principle in the above mentioned story fits this perfectly. But no material thing could (without resulting in *reductio ad absurdum*) travel in time.

Again I want to extend an invitation to your readers and authors to refute this statement in "The Reader Speaks" column.

William J. Sybura,
Long Island City, N. Y.

(This subject is of such unusual interest to everyone interested in the latest scientific developments that we will be pleased to allow our readers and authors to discuss it among themselves. We therefore invite letters on both sides of the question. Authors of time traveling stories especially are invited to defend this criticism of their themes.—*Editor.*)

Ants Twenty Feet High

Editor, Science Wonder Stories:

Dr. Keller is full of pink prunes. Who ever heard of ants twenty feet high? Absolutely silly. Being a writer myself I can easily understand why folks like to spin a good yarn, but there's such a thing as shocking the human intelligence to the extent of murder. In diagnosing the "Human Termites" I can only arrive at two conclusions, either the author was a victim of temporary insanity, or he had a bad case of the D. T. ailment. Which? In either case he wins the silk-lined tomato can. There! If Dr. Keller is going to give us that kind of stuff, then he had better return to obstetrics. But—"The Human Termites" is the only yarn I can kick about. So there's hope! I've read an awful lot of magazines but the *Gernsback Publications* beat them all. They're a real find, and so thoroughly satisfying that I'd gladly and freely pay more for them. Here's all the luck in the world to you, and to your wonderful artist Paul, and—well, you might tell Dr. Keller I'm not as mad as I was. After all my indignation was perfectly natural as I hate to see one in the profession write such stories, especially as he is a realist.

Pearl Hamilton Elliot,
17 Merriam St.,
Hempstead, L. I., N. Y.

(Apparently Miss Elliott takes it for granted that evolution has reached its final stage, and that further development is impossible. Man is still in a state of transition, and so are all other living creatures. The mere fact that certain and definite forms of life have been reached and have persisted during the relatively few seconds covered by the life of man is no indication that they will always remain as they are. The world is full of a number of things nobody knows anything about. If the mastodon and the brontosaurus were to reappear we would not believe our eyes—and yet these creatures existed.

Man is learning to control evolution—through artificial means. Luther Burbank changed the natures of flowers and fruits. Scientists have changed the sex of birds and animals. A Japanese scientist says he is able to change the racial characteristics of an infant. Ants twenty feet high, as a product of artificial evolution, are by no means impossible. And did Miss Elliott know that in Australia there are common earth worms SIX FEET long, and over one inch thick? —*Editor.*)

The Human Being Makes His Own

Editor, Science Wonder Stories:

In one of your stories recently the author said that the scope of a televiewing machine was limited, or rather affected, by the curvature of the earth. This, to me, seems silly.

We know that the crystal reflects scenes in Asiatic countries. We also know that the radio set is not limited by the curve of the earth's atmosphere. Televiewing, Television and Tele-sound, if the terms are good, all depend on Hertzian waves, and they ripple uninterruptedly clear around the earth, and as far as we know, on out through space into the fourth dimension and probably a lot of other dimensions that we know nothing about at present.

To me, the most unreasonable words in the language are "limitation" and "impossible". Man positively has no limitations excepting those he places about himself. There is nothing impossible. Quite often they say "It is impossible for a male human to become a mother". That is not impossible at all, for there are at least eight such cases on record. Another put "impossibility" that is cited is virgin birth. There are on record innumerable cases of such birth. Two very recent occurrences are that of a ten-year old girl in Ohio and a twenty-five year old girl in New York City. Both of these cases were given considerable space in the medical journals and I am sure that, unless professional confidence should interfere, the doctor would discuss such cases with you.

In a recent editorial you yourself said space travel was "impossible" because of increased pressure under acceleration. The area under which such pressure would develop, if I am right, is the first fourteen miles measured within the earth's atmosphere. What is to prevent the building of a space flyer that would take the first fourteen miles at a low rate of speed and then accelerate gradually over the next one hundred thousand miles or so? When we begin engineering into planetary distances no laws or rules that we have on earth will apply as far as we know. We are dealing in the unknown and there certainly seems no reason for placing any self-constituted "limitation" on our imagination.

When any of your readers or authors begin talking about the "impossible" they confess that they have limited themselves, and this is their own folly. It indicates to me that their knowledge is limited, and I hope this letter will help them undetter themselves in this regard.

Anthony Pelcher,
New York City.

(Concerning the motion of the Hertzian waves, and their entrance into the "fourth dimension", it would not be inappropriate to state that this dimension, as used by Einstein, refers to time, and nothing more.

Mr. Gernsback denies emphatically that he ever wrote an editorial in which he maintained that space flying was impossible due to increased pressure under acceleration. Nothing is further from his mind. The editorial to which Mr. Pelcher refers appeared in another magazine with which we have no connection. The editorial staff of Science Wonder Stories certainly does not subscribe to the sentiments expressed in that editorial. To our minds, there is no truth contained in it, and it is distinctly misleading.

The question of acceleration, in fact, is not the big bugaboo when it comes to space flying, and is easily overcome, for it is possible with sufficient power to accelerate the motion of a space flyer gradually. This has been done recently when the English Schneider Cup flyers flew at a speed of 332.8 miles per hour and no bad effects at all were noted.

Acceleration becomes only troublesome when it is done too swiftly.

An interesting article by the famous German Rocket expert, Max Valier, which will be published in an early issue of this magazine, also brings out this point in a most illuminating manner.—*Editor.*)

No Discrimination Against Women

Editor, Science Wonder Stories.

I have just finished the "Radium Pool" and thought it very thrilling and cleverly written. I was very much pleased to receive your Science Wonder Stories and wish to congratulate you on your success. I have a personal interest in them; and think it will be very interesting to save all the issues and have them bound for future reference. I just received the November issue and look forward with pleasure to the reading of "The Human Termites", as I have saved the installments to read all at once.

I thought "The Marble Virgin" was very well written, though the author did take the plot from mythology.

By all means give us stories with lots of imagination and beauty. Most of us read to carry ourselves away from the work-a-day world. Interplanetary stories head the list in my estimation. Second comes the finding of strange places and peoples on or in the earth. I do wish you would print Jules Verne's "To the Center of the Earth." It is certainly interesting.

The SCIENCE NEWS SECTION is a very good idea and THE READER SPEAKS is immensely interesting, but anything more technical spoils the magazine and robs it of its purpose. I hope you will print more stories in the magazine in the future. There aren't enough in it.

(Continued on Page 765)

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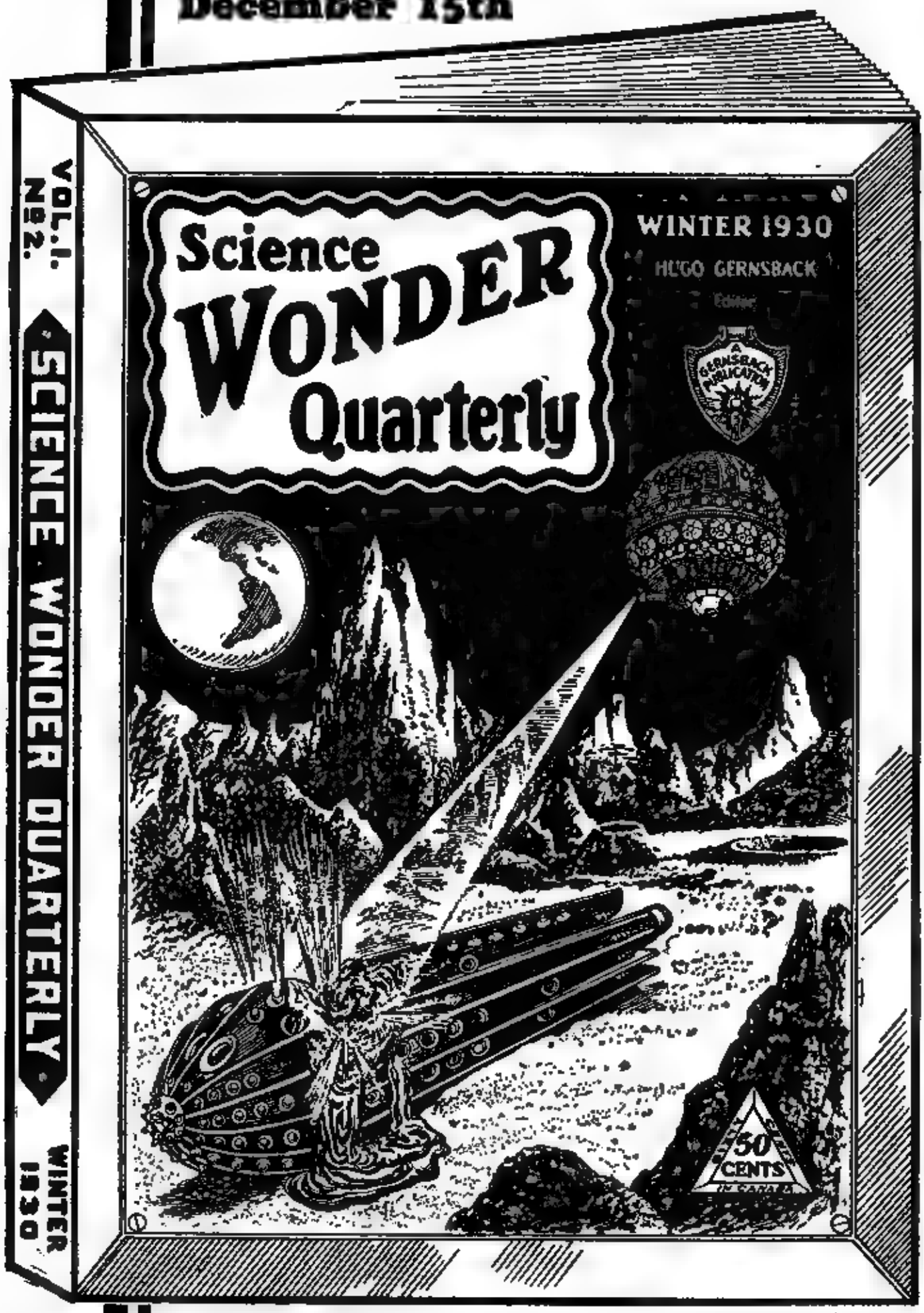

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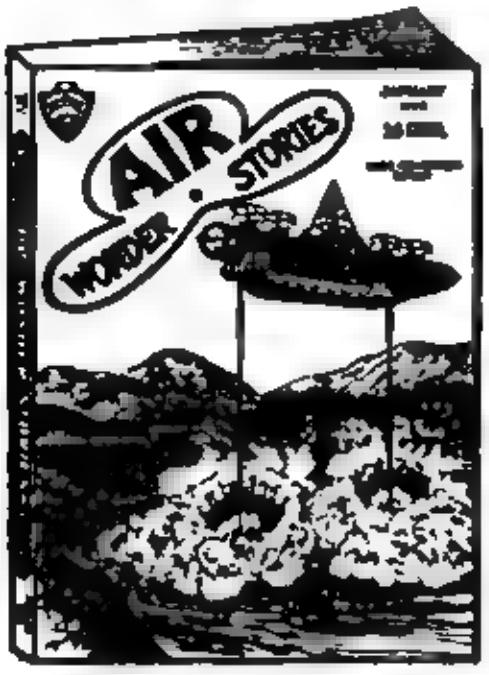

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The Reader Speaks

(Continued from Page 762)

Stories of Detective Tales are very interesting to my mind. I hope we have more of them.

I have noticed that you print more letters written by men than by women, as I suppose this won't get in. Nevertheless, I wished to let you know how much I enjoy your new magazine. I am a SCIENCE WONDER STORIES fan and hope to collect a library of your stories.

Mrs. Verne Pullen,
1627 So. 15th St.,
Lincoln, Nebr.

(As you see, we are printing your letter. We have no discrimination against women. Perish the thought—we want them! As a matter of fact, there are almost as many women among our readers as there are men. The only difference is that our male readers usually bring up some point of scientific interest, while the ladies contest themselves with general expressions of approval or disapproval. We are always glad to hear from our feminine readers. Oh yes, before we forget it, we need the lady readers if only for their much (to us) needed intuition. To explain: You want more of Dr. Keller's "Tales from Prison." Your intuition was correct. Dr. Keller wrote six TALES SCIENTIFIC DETECTIVE STORIES for our new baby, SCIENCE DETECTIVE MYSTERY." The first story is in the initial issue, out on the newsstands Dec. 14th.—*Editor.*)

Edison's Contestants Read Science Wonder Stories

Editor, Science Wonder Stories:

I wish to compliment you on your new publication. I believe that it is even better than the old. Paul is up to his old standard, which is almost perfect. And don't let them tell you anything about putting on a quiet cover. This is one of the most attractive features of the magazine. "The Reader Speaks" is very interesting and I hope you continue to make it plenty long. It would be of no use to try to give all your interplanetary stories to the sister magazine; for we readers would immediately stop it with an injunction. *It might interest you to know that out of all the boys who took Edison's examination, two said that they read* SCIENCE WONDER STORIES. This beats all other purely fiction magazines. Details may be found in the *Literary Digest* for September 28. Your magazine certainly possesses educational value. The following is my classification of the stories. For new readers, this is the system. Old readers probably know it already. A—Fine; B—good; C—poor; D—poor; E—bad.

A

Reign of the Ray—Good but rather flat in the end.
Making of Misty Isle—Rather good about the plans of mice and men.
Alien Intelligence—Keep it up, Williamson.
Beneless Horror—Up to standard, but inappropriate title.
Menace from Below—Wonderful.
Feminine Metamorphosis—Dr. Keller's usual good work.
Human Termites—Marvelous in first part but dull in second.
Cubic City—Short and snappy.
Eros to Earth—unusual.

B

Warriors of Space—Threat of the Robot—Moon Beasts—Eternal Man—Radium Peak—Onslaught from Venus.

C

Diamond Maker—Boring.
Metal World—Poor plot.
In Two Worlds—Boring.

E

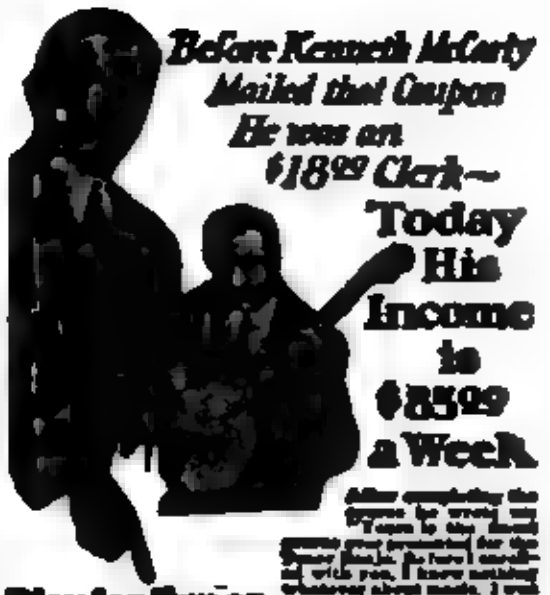
Marble Virgin—Incomprehible trash. The scientific faults have been enumerated too many times to bother now. Don't tell me that any board of science editors ever passed on that. I believe in heresy, but McDowd went too far.

"The Shot Into Infinity" is a masterpiece and I urge everyone to read it without fail.

Philip Waite,
3400 Wayne Ave.,
New York, N. Y.

(The fact that the contestants for the Edison scholarship read SCIENCE WONDER STORIES is an undeniable indication of the appeal this periodical possesses for alert, intelligent, educated young people. These boys represent the intellectual cream of the younger generation—the generation which contains the great scientists of the future. —*Editor*).

(Continued on page 765)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The Reader Speaks

(*Continued from Page 765*)

Too Many Cling to Blind Dogmatism

Editor, Science Wonder Stories:

I wish to take this opportunity to congratulate you on the exceedingly fine stories you publish in SCIENCE WONDER STORIES.

I have no criticisms. Every story has its point and if one only exercises his mind he will find it. Too many of the readers cling with blind dogmatism to the theory of this, that or the other "teacher" or "professor"; and when some one brings forward views, not to their liking, they throw a fit. Why don't these chronic "brick batters" write some perfect stories? We await them.

I greatly appreciate Dr. Keller's "The Human Termites"; he has the courage to set down his stories, without placing silk cushions under them. His theory of central intelligences is plausible and will very likely prove to be fact.

I am indeed sorry to see some people, in their letters, throwing mud upon the good name of an author and offering an insult to the intelligence of the editor. It is a thing I would never be justified in doing.

Why do other people insist on dragging their beliefs in or against a God, Supreme Intelligence, Universal Mind, First Cause,—as you will—across every periodical they come to? Each and every one has a personal conception that will perfectly fit his particular state of consciousness, but which absolutely will not do for any other individual in the entire world. Therefore it is useless to argue the question or to try to prove it one way or another. Each will stand firm for his theory; and haggling is a waste of time and space. Therefore, let us have an end to the subject and keep the Readers Department for strictly scientific criticism.

Paul Hendrickson,
Lancaster, Ohio.

(Mr. Hendrickson's broad-mindedness is a credit to his intelligence. Naturally, a person writing to this department does so to express his own personal convictions; but to find someone above such considerations is unusual. We endeavor, however, to give every reader a chance to express his feelings.—*Editor*).

Will Have to Write His Own Stories

Editor, Science Wonder Stories:

In your November issue, Mrs. Helen Ammons of Chicago, Ill., accuses readers of SCIENCE WONDER STORIES of being afraid to disagree with you on the merits of Dr. Keller's story, "The Human Termites." Well, I am one of your readers who was deeply disappointed in this story. I would say that Dr. Keller dispenses reading material which insults the intelligence of a mature mind. I do not find anything in the story which could not have been written by a high school boy, providing he possessed a wild imagination.

It will be surprising to me if you do not get a flood of letters denouncing this story. I admire Mrs. Ammon's courage in expressing her opinion of "The Human Termites," but believe she was hasty in judging the character of other SCIENCE WONDER STORIES readers. Most of your authors, including Dr. Keller, seem to believe that they would fall short of satisfying the tastes of their readers, unless there is warfare depicted, not to mention destruction, disaster, disease and dreadful death.

Now, I read science fiction because I much prefer its stimulant to the imagination, rather than the depressing money mad wonder stories with which the market is glutted. However, I shall have to start writing my own stories, if (as seems the case) present authors lack the constructive imagination to produce stories which elevate the spirit as well as the mind.

I have written rather plainly, but believe you need this for the ultimate good of SCIENCE WONDER STORIES.

And I do not know, perhaps your readers prefer stories like "The Human Termites" with its profusion and confusion of impossibilities.

Al. Hansen,
1806 H. Street,
Sacramento, Calif.

(We are glad to print a letter as frank as this one. We wish to be guided by the tastes of our readers. Dr. Keller, in the opinion of most of the critics, has written a profound and stimulating story. The majority of our readers liked it. We would be glad to hear from any one who wishes to add his point of view to this interesting discussion.—*Editor.*)

BOOK REVIEWS

EAT, DRINK, and BE SLENDER, by Clarence W. Lieb, M.D. 193 pages, cloth covers, size 5¼ by 7½. Published by the John Day Company, New York. Price $2.00.

This book is sub-titled "What every overweight person should know" and assuredly it gives an exhaustive survey of the various methods which may be safely used for reducing weight. "The book demonstrates that it is not necessary to suffer as a martyr in order to grow thin." The author, writing always with the average person in mind, has given a list of cures which may be used by people of average means, which involve no great expense, and which are, above all, practical and proved.

There is a special section devoted to "reducing fads" and the sound information to be derived from it will serve to enlighten those who have vainly placed their faith on patent medicines and nerve-racking diets. The only sane path to slenderness is the safe and scientific way. If people will allow themselves a sufficient length of time in which to reduce slowly and wisely they will find, according to this book, that they have acted for the best interests of their health.

NEW VIEWS OF EVOLUTION, by George P. Conger, Ph.D. 235 pages, stiff cloth covers, size 5½ by 8. Published by the Macmillan Company, New York. Price, $2.50.

This new volume is one of the "Philosophy for the Layman" series, and presents, in clear and understandable language, what may be called a history and philosophy of evolution. In other words, Dr. Conger not only traces the development of the various functions of the body, of the nervous system, and of the brain, but he also gives a symposium of views on the subject—views which have been presented by philosophers and scientists in years past. As the volume is the latest in its field, it may be regarded as authoritative, in so far as the newest discoveries are concerned.

An important feature of the volume, one we have not seen before, is a section devoted to the evolution of cultures. Human society, considered from the evolutional viewpoint, receives a treatment which should assist in clarifying the conception of society as it exists to-day.

THE COWBIRDS, by Herbert Friedman. 421 pages, illustrated, stiff cloth covers, size 6½ by 9¾. Published by Charles C. Thomas, Springfield, Illinois, and Baltimore, Maryland.

Mr. Friedman has, with the assistance of the National Research Council, and various universities both here and in South America, produced a volume which is the accepted scientific authority in its own field. The author, working on his subject for nine years, has thoroughly investigated every phase of the bird life in which he is interested, and his book, "A study in the biology of social parasitism," has omitted nothing which may directly or indirectly concern the parasitic birds.

The work is by no means intended for the layman, but is a treatise for scientists. The non-scientific reader, however, will find much in it that will interest him, and much that will amaze him. He will realize the enormous complexity of one small division of bird life and through this realization come to understand the overwhelming importance of parasitism in certain forms of life.

CHEMISTRY IN MEDICINE, edited by Julius Stieglitz. 757 pages, illustrated, leather covers, size 5½ by 7½. Published by The Chemical Foundation, Inc., New York. $2.00.

The book, "Chemistry in Medicine," is edited by an eminent scientist who has the assistance of others equally well known. Its purpose is to present to the public and to the medical profession the great possibilities for advance in medical science through further intensive co-operation between chemistry and medicine. Already the progress made has been enormous, and in the future there is every possibility that the achievements of the past will be eclipsed.

The volume is a mine of information for the layman. It treats every important division of disease and bodily defense, showing how chemistry is of invaluable aid to the continuance of the health of the individual. Special attention is given to diseases of children and to the bodily conditions that lower resistance to these diseases. The legend beneath the frontispiece, which was widely advertised, is "May the memory of lost children urge us on;" and assuredly the work of the organization sponsoring the volume has more than fulfilled the expectations of those dependent upon it. We can recommend this volume without reservation as one of the most valuable, from the viewpoint of the average reader, in its field.

PEEPS AT MEN OF THE OLD STONE AGE, by James Baikie. 90 pages, illustrated, stiff cloth covers, size 7¾ by 5¼. Published by A. & C. Black, Ltd., London. Price, $1.00.

This little volume presents an unusually interesting picture of the dim ages before man made his appearance, and before any type of life existed on the earth. Starting with the earth in its original molten condition, the author leads us through the eras to the ages when life began; when the first forms of animate matter made their appearance in the water.

The chapters on the development of man from the lemur to the Java ape-man and the Piltdown man, and then on to the Mousterians and the superior Cro-Magnons, are arresting as a record of progress; but they lack the drama of the earlier chapters on the reptiles. There is a great deal of information, however, on how the idea of shelter first made itself felt, how man managed to drive the great cave bears and lions from their rock homes, and how, by the use of crude weapons and the discovery of fire, he was able to vanquish monsters much more powerful than himself.

The book takes the history of man to the period of the cave artists, who left records of their lives in the caves of France and Spain. According to the author, the Old Stone Age began to disappear when the first rough dugouts were launched. This book, with twelve full-page illustrations, has given an enlightening picture of the men and customs of prehistoric days.

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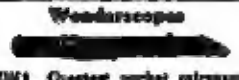

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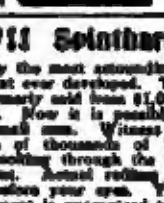

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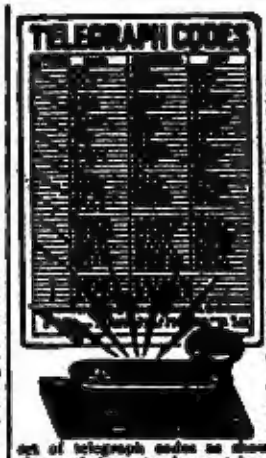

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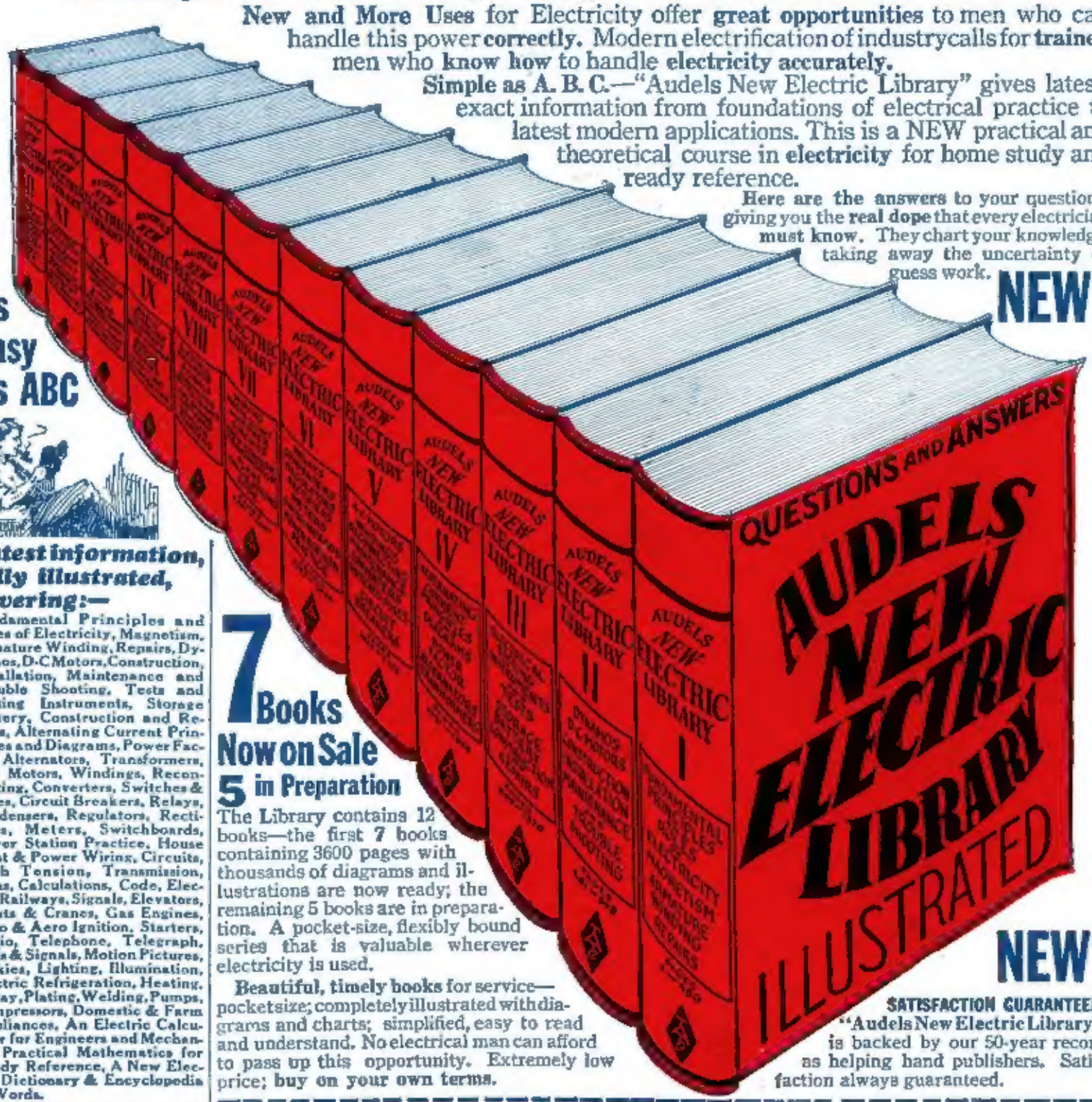

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